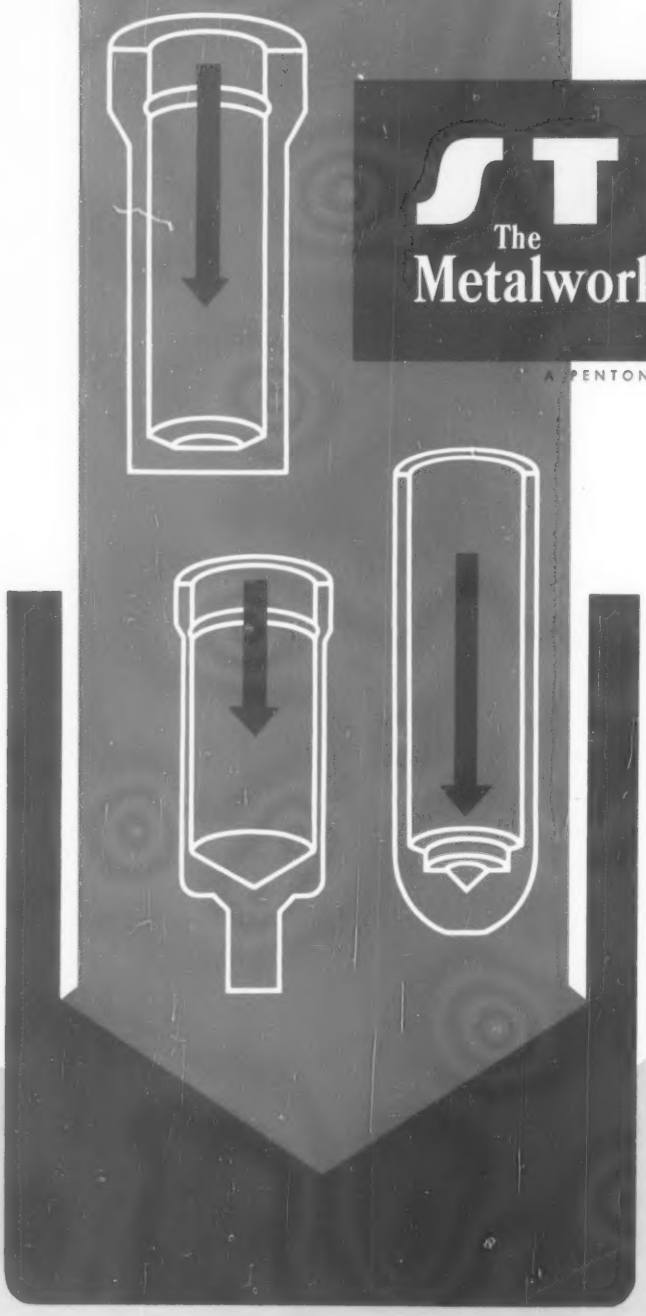
MAY 6, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION



production ideas
NO. 10 OF A SERIES

Impact Extrusion

Partmakers are beginning to realize its full potential . . . page 85

- **Appliances of the Future . . . page 62**
- **Steel Inventories: 30-60 Days . . . page 127**

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MORE from Allis-Chalmers—

Dependable Power for Industry

APPLY the many cost-saving features of Allis-Chalmers deep-rib motors in a variety of plant uses whatever your product or process.

Here's why these motors offer more dependability in industry after industry:

MORE Cooling Surface — Rib-type design provides reserve cooling capacity in dirty locations.

MORE Iron — Cast-iron frame and external parts assure greater rigidity and resistance to corrosion.

MORE Copper — Greater use of copper provides top electrical performance.

MORE Lubrication Provisions — Large grease reservoirs surround bearings. Provision made for in-service relubrication — important where moisture or corrosive vapors may contaminate grease.

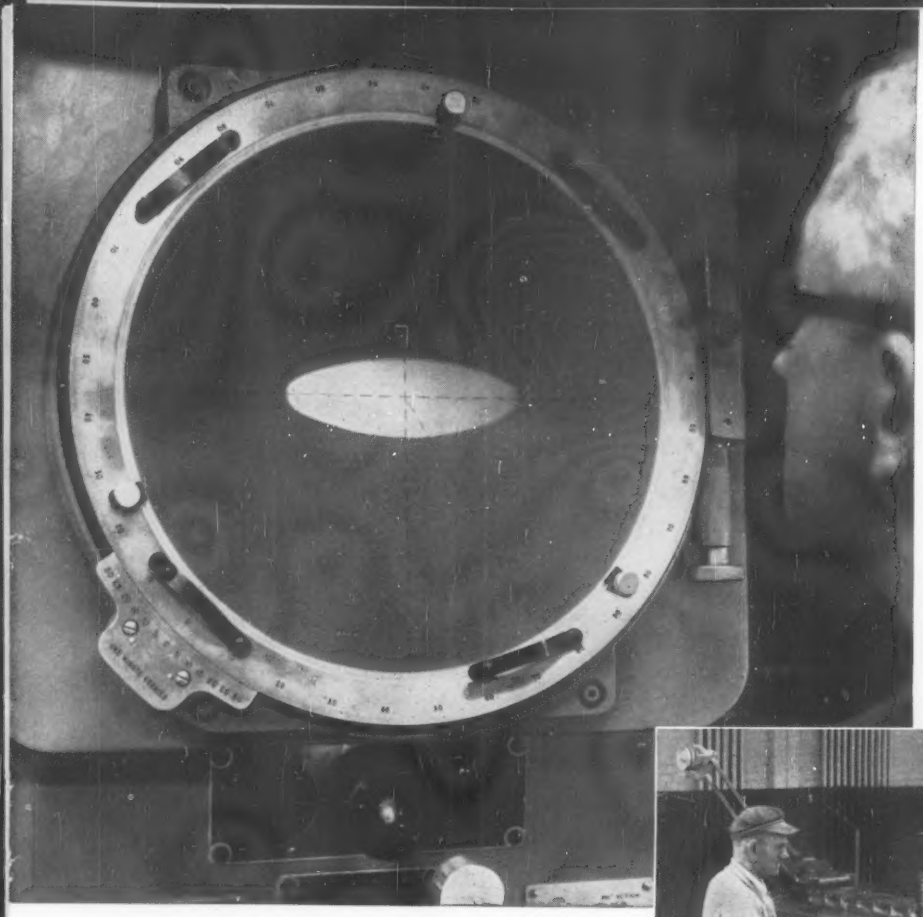
Rib-Type MOTORS 1 to 100 hp

Rib construction is available in Allis-Chalmers motors from 1 to 100 hp. As a new machinery component or as replacement, specify Allis-Chalmers. Contact your A-C district office or distributor, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.

ALLIS-CHALMERS

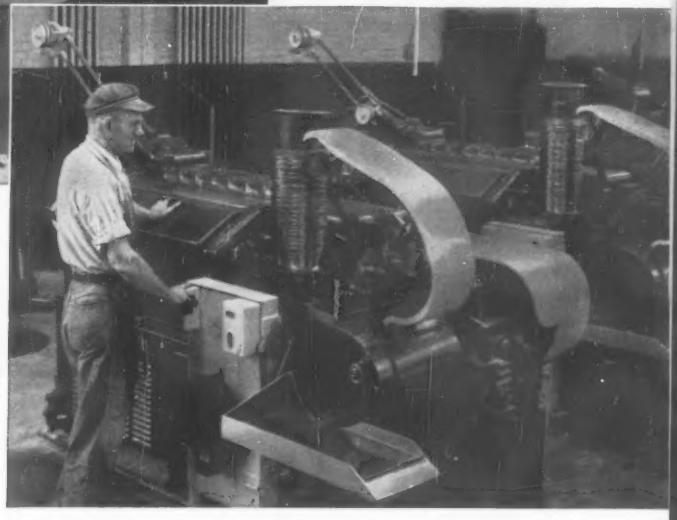
A-C ALLIS-CHALMERS

A-5317



A sample of oval wire is checked for accuracy by an inspector as he studies the image, here magnified 20 times, on an optical comparator.

This battery of continuous, wet-drawing machines is typical of our new facilities for producing fine wire. Note that the machine in the foreground is spooling fine wire as it comes off the block.



Shaped wire and fine wire— Bethlehem specialties

There's nothing "run of the mill" in making shaped and fine wire. That's why we have expanded and re-grouped a special division of our rod and wire mill at Johnstown, Pa. It's our "Fine and Specialty Wire Department," in which we now have a variety of brand-new equipment of the most modern design. It's our latest step towards specializing in the making of fine, flat, and shaped wire.

We're now drawing fine wire to sizes as small as 0.007 in. (40 gage). And we can furnish fine wire with liquor, white-liquor, coppered, and other finishes, including redrawn bethanized—electrolytically coated with 99.9-per-cent pure zinc. We have the equipment to offer fine wire in a wide range of spool sizes. And we have the heat-treating facilities, drawing blocks, and other equipment to provide a wide variety of tempers and physical properties.

We regularly make flat, square, octagon, hexagon, oval and an increasing number of other shapes. Shaped wire offers many advantages to the fabricator. For example, oval wire has more surface than round wire of the same cross-sectional area. This feature, for example, is useful in reinforcement applications where the greater surface area improves cohesion between the material to be reinforced and the steel wire itself.

We've never been in such a good position to offer prompt delivery of shaped and fine wire in production quantities. The nearest Bethlehem sales office will give you the details. And you can be sure that our people in the mill, as well as in the sales office, will work with you all the way.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

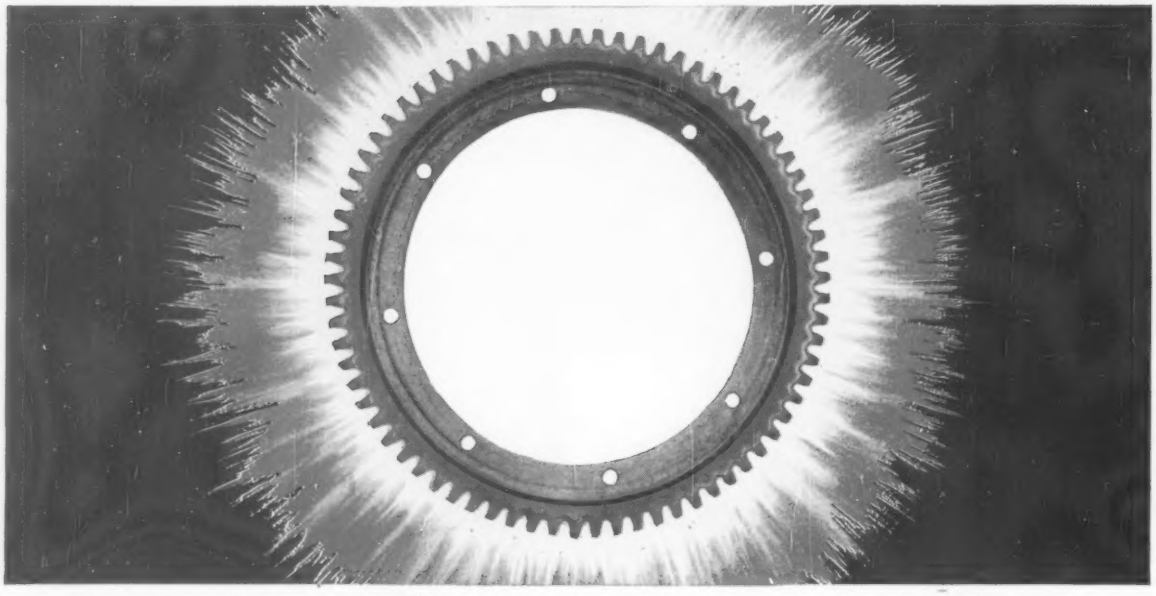
On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

IH Saves $82,507 Per Year

with TOCCO Induction Hardening*



Gears, shafts, pins, wheels, tubes and bars—almost any size or shape of part—or any metal, too—is adaptable to TOCCO hardening, brazing, annealing or heating for forging.

Production Up—Engineers at the Milwaukee Works of International Harvester Company have adopted TOCCO for hardening final drive gears for famous International Harvester farm tractors. TOCCO increases production on the gear shown here from 14 to 35 per hour, 250% faster than conventional heating method, reduces job from a 3 shift to 2 shift operation, even with increased production schedule. Heating time is 35 seconds; oil quench, 60 seconds.

Costs Down—TOCCO cuts cost—saves $82,507 per year on application shown above. TOCCO makes possible use of C-1050 A.R.R. steel instead of expensive A-8645-H alloy steel previously required. TOCCO also eliminates shot-blast, formerly needed to remove scale, and extra machining operations that used to be necessary to compensate for distortion.

Gear shown is 18½" O.D., width of face is 2", weight 34 pounds, 73 teeth. Hardness obtained is 55-66 R.C., using 140 K.W. of 10,000 cycle power.

Our Engineers can probably find applications in your plant where TOCCO can increase output and reduce unit costs.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today—**NEW FREE Bulletin**

The Ohio Crankshaft Co. • Dept. S-5. Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating".

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____

Extra stamina built into BAKER gas trucks makes them ideal for metalworking plants

One look at any of the Baker "FG" line of gas-powered fork trucks will show you why it is recognized as the most rugged in its class. But there are many things you don't see: the heavy-duty engine, designed expressly for industrial truck service; the sturdy Timken-power axle – integrated with the engine, transmission and clutch into a single unit, engineered for trouble-free service and long life; the Baker wide-angle steering axle – mounted longitudinally in jumbo rubber blocks to provide stability and absorb road shocks; the all-welded box-type frame with securely bolted counterweight; the channel-frame uprights with bronze inserts properly spaced to minimize sliding wear and add security in extended position.

These are but a few of the built-in features that mean more time on the job and more efficient performance in metalworking plants – where the work is heavy and the going rough.

Baker Gas Trucks are available in 2,000 to 7,000 pound capacities. For specific information, contact your nearest Baker sales office or write us direct.

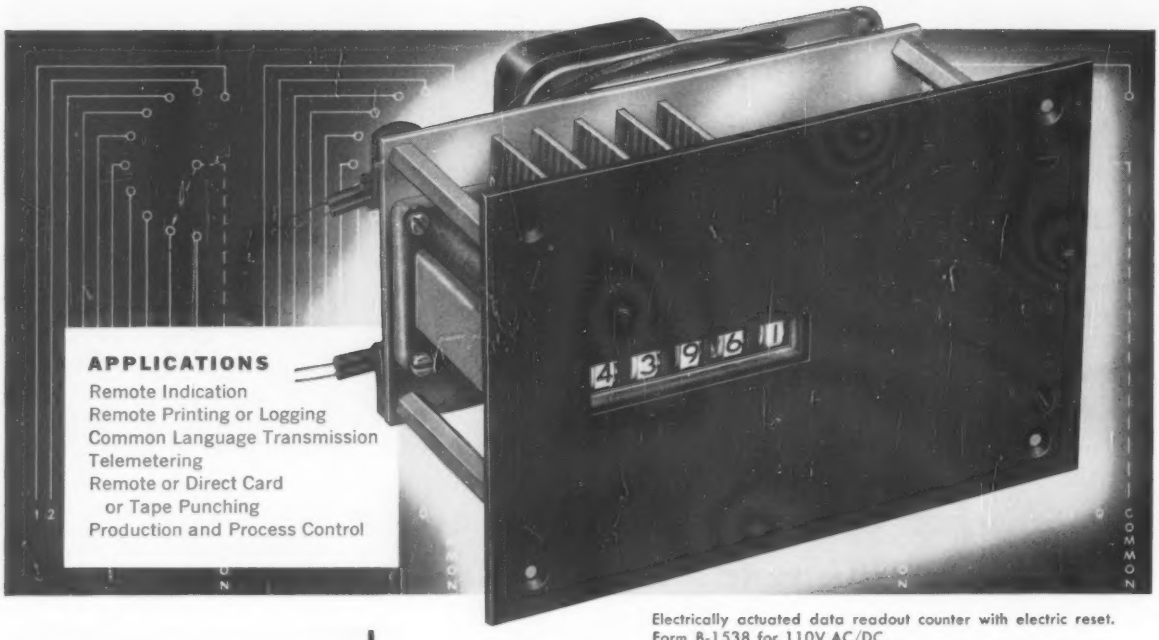
Baker®
industrial trucks

THE BAKER-RAULANG COMPANY
1259 WEST 80th STREET • CLEVELAND 2, OHIO
A Subsidiary of Otis Elevator Company
7G2

NEW

Data-Readout Counter

Provides 100,000 Distinct Circuit Arrangements



Electrically actuated data readout counter with electric reset. Form B-1538 for 110V AC/DC.

FUNCTIONS

Analog to Digital Conversion
Serial or Parallel Circuit Transmission
Continuous or On Demand Electrical Readout
Continuous Visual Readout
Visual and Electrical Data Storage
Predetermining
Repeat Predetermining
Sequential Programming

Veeder-Root's new series of Data Readout Counters combines visual indication with electrical readout for remote indication, recording, and controlling applications. *Electrically* or *mechanically* driven and provided with *manual* or *electric* reset, these counters present a positive display of accumulated totals and automatically create specific control circuit contact closures for each number visually displayed. Each instrument, with its five figure capacity, provides 100,000 distinct circuit arrangements which lend themselves to the most exacting control and transmission requirements. The counters are compatible with standard data processing equipment and offer a wide variety of applications in the industrial control and data processing fields.

Veeder-Root Inc.

"THE NAME THAT COUNTS"

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San Francisco • Montreal • *Offices and Agents in Principal Cities*

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Vol. 140 No. 18

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ENGINEER

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S-5-57

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VALVOLINE OIL COMPANY
(Div. of Ashland Oil & Refining Company)
FREEDOM, PENNSYLVANIA

Please rush my copy of your newest booklet entitled, "The Key to Rust Prevention," which tells about the problems of rust, cleaning my products, materials in corrosion preventives and how to choose a rust preventive.

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behind the scenes

On Guard

A great deal of heavy responsibility rides on the editors who produce this magazine every week. Aside from the attention they devote to the basic mechanics of writing, they are obliged at all times to guard against plunging themselves and their publication into hot water. An unguarded mention, a slip of an address, making a wrong credit, accepting information at face value, accidentally downgrading an important executive —why, there are so many ways to foul up a detail, it shouldn't happen to a dog editor. It should be revealed, therefore, that these writin' people meet every week to consider methods of improving their work, how to avoid editorial dangers and how to interpret signs and wonders.

Last week they gathered solemnly, lit their pipes simultaneously, and listened attentively while Associate Managing Editors Vance Bell and John Morgan, Copy Editor Harry Chandler, and Assistant Editors Byron Kennel and Bill Wallace listed dangers and pitfalls. Just before the meeting was called to order, the center of attention was a red flag planted primly in the center of the conference table. Happily unadorned by insignia suggesting the Soviet, and therefore acceptable to the most cautious bourgeois, it provoked more wonder than dismay. At the proper moment Mr. Bell bounded to his feet, pointed to the flag, and declared that it meant "On guard!"

Pitfalls Along the Way

Instantly, the editors went on guard. Chandler, the pundit of the blue pencil, told them that they must guard against wasting the readers' time. "Be cute," growled the honest fellow, shifting heavily on turned-in feet resembling those of an overweight Winnebago; "when they read cute stuff they get exactly nowhere. By all means, don't be specific. Don't weed out details. Be repetitious, redundant. Go long hair; use a $1.50 word for a 5-cent adjective. Interpret everything, too, particularly if the statement is obvious to begin with. Follow this procedure carefully, and you will waste up to 50 per cent of any reader's time."

Bell warned of the planted news story and the unreliable news source. "Good journalism demands constant checking," he said. "You just can't take anything for granted, and it's journalistic suicide to print anything without verification."

Byron Kennel elaborated on the phony publicity release and warned that sometimes the juiciest items weren't worth the paper they were printed on—and we'll throw in this advice, too: Cliches and bromides will dull the brightest stories, and isn't it amazing how they clutter our ordinary speech?

Bill Wallace, who isn't quite sure whether he is an editor or an artist, prepared some clever posters and flip cartoons to illustrate the remarks, and when the meeting was adjourned, all hands vowed they couldn't help but be better editors.

Scrub Team Clicks

Bill Dean, one of STEEL's Chicago editors, has cooked up an interesting article for you concerning 125 laundry equipment manufacturers. Bill went down to French Lick, Ind., where the laundry equipment people had gone into a huddle over present and future prospects, and he reports that these gentlemen are pointing for a cleanup in more ways than one. "They went into a brainstorming session," said Bill, "and even their own equipment never showed more agitation. They kicked around enough ideas to occupy their attention for a decade, and I can tell you that their future looks brighter than the whitest wash in town." You will find this story on page 62.

Numbered Syllables

This one came from an old lady who drove her car only on Sundays, a preoccupation that possibly gave her time to crib things from puzzle books. "Write in English," she says, "the least integer not namable in fewer than 19 syllables. For example, 609 may be written 'six hundred and nine,' or five syllables."

Shrdlu

(Metalworking Outlook—Page 45)

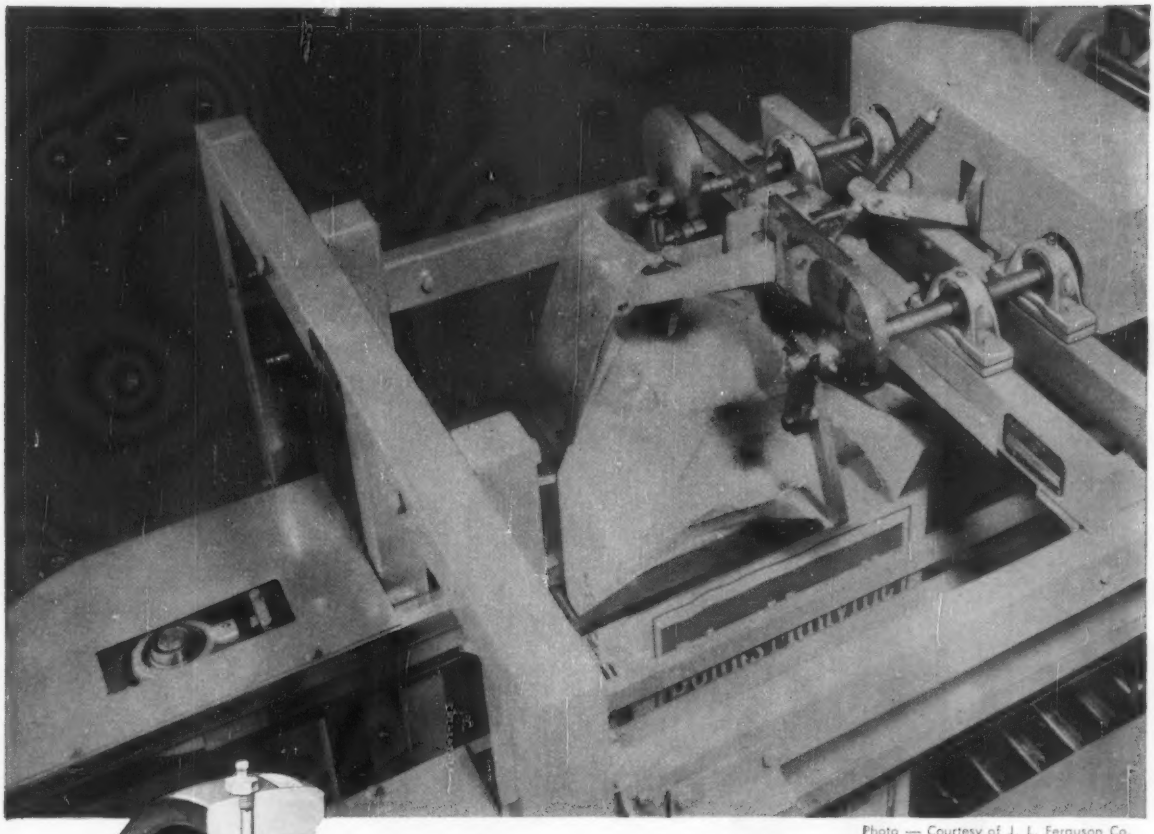

Photo — Courtesy of J. L. Ferguson Co.

Write for Bulletin 454 for full information

SEALMASTER

QUALITY PAYS OFF MOST WHERE "DOWNTIME" IS MOST CRITICAL!

Over 7,500 metalworking industry plants now operate on a mass production basis. Within these multiple unit plants, production efficiency is all important and "downtime" critical. The men responsible for manufacture and assembly of the end products of these plants wear varied titles. They share a common goal, however, of reduced over-all manufacturing and assembly costs of an end product. This does not mean that the components they buy for use on the machines they produce or for the equipment operated within their plant, must initially cost less. Rather, they must pay off long range through continuous trouble-free performance.

If this responsibility is yours, you will want to know more about SEALMASTER Ball Bearing Units and their exclusive combination of features. Find out today, how they're designed to outperform . . . performance is "must!"

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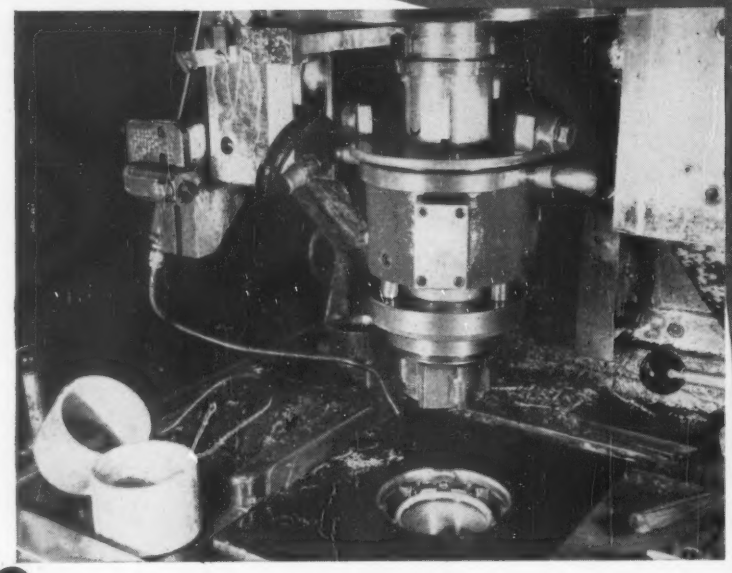
SEALMASTER BEARINGS A DIVISION OF STEPHENS-ADAMSON MFG. CO. 99 RIDGEWAY AVENUE, AURORA, ILL.



LANDIS TAP threads couplings 2½" - 6" dia.

The wide range of the LANDIS Tap resulting from its detachable-head design makes it an extremely versatile and effective threading tool. At the National Supply Co. in Etna, Penna., one LANDIS 4LL Tap is used for tapping many different diameters of straight and tapered threads in standard and A. P. I. line pipe couplings.

In the operation shown, this Tap on a Vertical Tapping Machine is threading conduit couplings of 4" galvanized H–40 Seamless Tube stock. 4.4191" pitch diameter Straight Pipe threads, 8-pitch, are tapped 3½" long straight through. 50 pieces are threaded per hour at a speed of 41 surface-feet-per-minute, and 400 pieces are completed between chaser grinds.

The detachable-head design of LANDIS Taps allows the use of various sizes of tap heads on the same tap body. As a result, a wide range of diameters may be threaded with a minimum tool investment. The 4LL Tap illustrated here, for example, using 7 different Tap Heads, will thread all coupling sizes from 2½" to 6".

When producing tapered threads, the LL Tap features a mechanical receding action of the chasers. This reduces cutting strains by restricting cutting action to the chaser throat section and results in a precision conical thread.

For more complete information on LANDIS ALT Taps for straight threads, LANDIS LL Taps for tapered threads, and many other LANDIS Taps for special-purpose threading, write for Bulletins G-94 and G-95.

LANDIS *Machine* COMPANY

WAYNESBORO • PENNSYLVANIA • U. S. A.

439

Another Goodyear First:

V-Belts

with the Green Seal

stay matched from factory to drive

The Green Seal signifies true dimensional stability. It means that now when you reach for a matched set of V-belts, you can be sure they're matched – no matter how long they've lain on the shelf. And that means longer life and a minimum of down time.

It used to be that only steel-cable V-belts by Goodyear were length stabilized. But now, through the miracle of Triple-Tempering, they've been joined by all the other Goodyear Industrial V-belts.

Triple-Tempering is the exclusive process wherein synthetic cord is carefully brought to the peak of strength and stability by controlled tempering with Tension, Temperature and Time. And this gives you not only *length* stability in storage, but greater shock- and stretch-resistance on the drive.

In addition to 3-T load-carrying members, the Green Seal also brings you "balanced construction." This means each component of the belt is specifically designed to its job to give you cleaner, smoother, longer running which adds up to maximum, trouble-free horsepower hours at minimum cost.

The next time you need V-belts, be sure they're wearing the Green Seal–the mark of a V-belt made with the technical know-how of the world's largest rubber company. They're readily available at your Goodyear Distributor. Or write for details to Goodyear, Industrial Products Division, Lincoln 2, Nebraska, or Akron 16, Ohio.

DIMENSIONALLY STABLE V-BELTS by

GOODYEAR

THE GREATEST NAME IN RUBBER

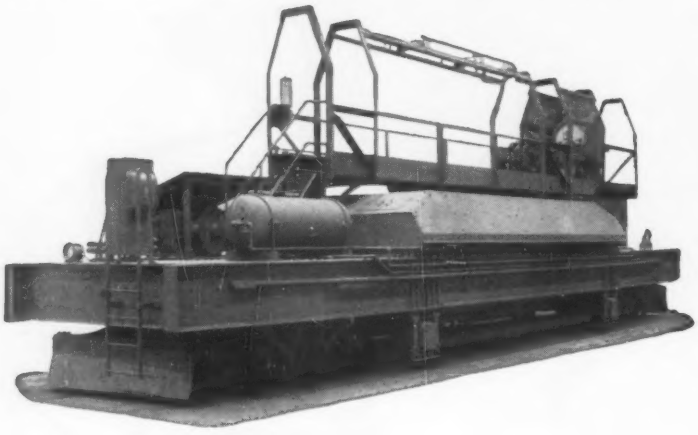
Green Seal–T. M. The Goodyear Tire & Rubber Company, Akron, Ohio

STOCK HOUSE OR HIGH LINE

operators prefer the

DEPENDABILITY OF ATLAS CARS

These specially designed units are another example of the ruggedness of Atlas Cars. Their dependability helps maintain the most rigid furnace charging cycles.



40-TON SCALE CAR

Double Hopper Bottom Dump

75-TON ORE TRANSFER

Gable Bottom Double Side Dump

THE ATLAS CAR & MFG. CO.

ENGINEERS MANUFACTURERS

1140 IVANHOE RD. CLEVELAND 10, OHIO, U. S. A.

LETTERS
TO THE EDITORS

Appreciates Receiving STEEL

We in the Bell Aircraft quality department wish to express our thanks for being made recipients of STEEL. After reading your informative issues, I turn them over to our chief inspector of assembly and our chief inspector of fabrication. They, in turn, pass them on to those parties they feel will be interested. Thus, your coverage extends to the complete Niagara frontier.

Richard A. Schott
Supervisor Material Review
Bell Aircraft Corp.
Buffalo

Concurs Fully with Article

Your Apr. 8 issue carries an article, "Small Tires Are Leakers" (page 74), as a part of your Mirrors of Motordom column. We are anxious to obtain a reprint and your permission to reprint this article for our sales bulletin.

We manufacture the Henderson Tire Changer and concur 100 per cent with this story.

David W. Besuden
Sales Manager
Big Four Industries Inc.
Cincinnati

• *Permission granted.*

Sharing Profits

Your third article in the 1957 Program for Management, "Profit Sharing" (Apr. 15, page 115), is of great value to me. It enables me to compare our profit sharing plan with those of other companies and brings out many points of value that I had overlooked.

Stanley E. Nilson
President
Flat Metal Mfg. Co.
Franklin Park, Ill.

We are enthused over the enlightening information in this article. Please send three copies of it as well as the first two articles in your 1957 Program for Management.

C. W. Ringwood
Vice President
George S. Fawcett Inc.
Los Angeles

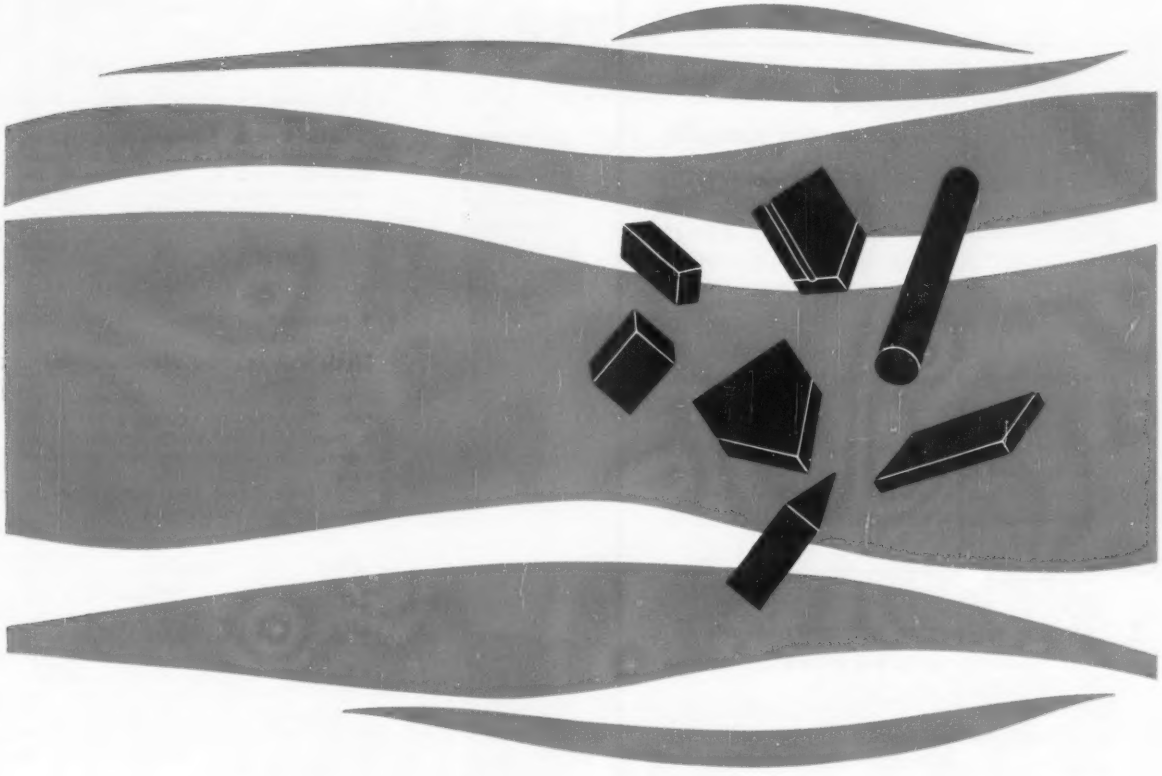
Proper Perspective

Your article, "How Ready Are Ceramics?" (Apr. 15, page 126), is well handled and should do much toward keeping the material in proper perspective.

I noticed just one error. The cutter assembly drawing on page 127 carries a

(Please turn to page 12)

Carbide *tools were born in an Ajax induction furnace*



Induction heating melting

AJAX

NORTHRUP

Carbide tipped tools provide industry with the hardest, toughest, most wear-resistant cutting edges in existence. But it wasn't long ago that the first commercial tungsten carbide—at $400.00 a pound—was created in the 2550°C. heat of an Ajax-Northrup induction muffle furnace.

Today, more than 85% of all the carbides used in industry are made, sintered, and hot pressed with induction furnaces especially designed by Ajax.

The fascinating history of induction heating and its unique application to melting, forging, and heating operations throughout industry are told in a new book. Write Ajax Electrothermic Corporation, Trenton 5, New Jersey, for your copy.

The Carbide industry is just one of many which owe their existence to Ajax-Northrup induction heat.

ASSOCIATED COMPANIES: AJAX ELECTRIC COMPANY—AJAX ENGINEERING CORPORATION

These Oakite shortcuts speed your metal cleaning

1. Cleaning and rustproofing
—in one washing operation.

Oakite Composition No. 98 (used cold or hot in one-stage or two-stage washing machines) quickly removes cutting oils and chips and leaves a thin film that protects steel against rusting between operations or during temporary storage.

Excellent for cleaning before inspection: the metal is cool for immediate handling and the film (too thin to affect measurements) prevents finger prints from corroding highly finished surfaces.

One auto manufacturer uses No. 98 in seven plants for cleaning and rustproofing brake cylinders, camshafts, connecting rods, crankshafts, cylinder heads, flywheels, push rods, tappets, wrist pins, etc.

2. Stripping pigmented paints—*with no need for pickling before repainting.*

Oakite Rustripper saves money in paint shops by doing a complete stripping job in one operation. It eliminates extra pickling and neutralizing to remove the metallic pigments, phosphate coatings and rust that prevent successful repainting.

A television manufacturer says "We formerly took 25 minutes to strip rejected cabinets, then had to pickle to remove tarnished phosphate coatings. Today 10 minutes in Rustripper strips the same cabinet so bright and clean you can't tell it from new. Eliminates pickle, neutralize and rinses."

An auto parts maker uses Rustripper for continuous conveyor line stripping. "Cycle of 1 minute and 50 seconds works like a charm stripping paint and incidental rust from rejects and hooks."

FREE For full information write for booklets:

1. "*For Power Washers—Oakite Composition No. 98*" or
2. "*Here's the best shortcut in the field of organic finishing.*"

Address Oakite Products, Inc., 34E Rector St., New York 6, N. Y.

Technical Service Representatives in Principal Cities of U.S. and Canada

OAKITE

Export Division
Cable Address: Oakite

LETTERS

(Concluded from page 10)

Warner & Swasey Co. credit, but the idea of this illustration originated at Cameron.

J. F. Allen
Manager
Missile Plant
Cameron Iron Works Inc.
Houston

English Company To Reprint

The Shell Petroleum Co. Ltd. in England received a reprint of the article, "Plastic Speeds Patternmaking" (Feb. 11, page 108). It would like to reproduce this article for use in its sales development work in England. Your approval would be appreciated.

A. V. Snider
Manager
Export Department
Shell Chemical Corp.
New York

• *Permission granted.*

Finds Publication Newsworthy

We have read the comprehensive article, "Bearings for Tough Jobs" (Apr. 8, page 114) and would appreciate receiving four copies for our reference files.

We have found your publication informative and newsworthy.

Walter Fisher
Chief Engineer
Bantam Bearings Division
Torrington Co.
South Bend, Ind.

Timely Articles Help Buying

I wish to compliment you on the excellence of your publication. The subjects covered, and their timeliness, are helpful in the field of procurement for aircraft and missile programs. STEEL is read with interest.

N. W. Grigg
Materiel Manager
Pilotless Aircraft Division
Boeing Airplane Co.
Seattle

Wealth of Information

We receive your magazine and find a wealth of information which is useful to us. The copy with the article, "The Care and Feeding of the Junior Executive" (Feb. 11, page 93), got away from me before I had a chance to read it. Please send a reprint.

I found the article, "Grooming Middle Managers" (Mar. 18, page 93), interesting.

Keep up the good work.

J. D. Sowles
Office Manager
Framingham Welding & Engineering Corp.
Framingham, Mass.

Aids Planning

Please forward two copies each of the articles, "Exploring the Thermal Barrier" (Mar. 11, page 154) and "Wanted: Mach Metals for Jet Engines" (Mar. 18, page 107). The information they contain will be valuable in planning operations.

Edwin K. Jenckes
Ferro-Alloys Branch
Iron & Steel Division
Business & Defense Services Administration
Department of Commerce
Washington

SIMONDS
FLAT GROUND
DIE STEEL

OIL HARDENING TYPE — Non-deforming, spheroidize-annealed for best machinability and consistently uniform hardenability — from Simonds' own steel mill. Extra-smooth finish with all decarburization and surface defects removed. Wide hardening range. Individually packaged (18″ and 36″ lengths) with simplified heat treating instructions.

AIR-HARDENING TYPE — Non-deforming, spheroidize-annealed 5% chrome — more wear-resistant yet easy to machine and heat treat with uniformly excellent results — another product of Simonds' steel mill. Extra-smooth finish with all decarburization and surface defects removed. Wide hardening range. 36″ lengths. Individually packaged with heat treating instructions.

SIMONDS FLAT GROUND DIE STEEL can be the practical solution to *your* production problem . . . especially where cost and quality are important factors. When you use Simonds packaged high quality alloy tool steel some of your manufacturing costs have already been eliminated. You get better results at lower costs because this steel is precision ground to accurate dimensions with an extra smooth finish all ready for scribing and cutting to size or shape. What's more, its wide hardening range makes heat-treating virtually foolproof . . . makes this analysis steel suitable for a multiplicity of uses. Specify "Simonds" and be sure of the greatest satisfaction and lowest cost in the long run. "1001 sizes for 1001 uses" in either OIL or AIR Hardening type steel. AVAILABLE FROM STOCK.

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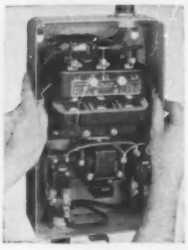
CLARK Type "CY" Starters need less maintenance ...when they do, it takes less time!

All parts in Clark Type "CY" AC magnetic starters are designed for dependable, heavy-duty, long-life operation. The exclusive "CY" principle of arc quenching—using strong multi-turn magnetic blowouts and double-break contacts—substantially lengthens contact life by minimizing arcing effects. Hundreds of thousands of Type "CY" starters in actual service have proved that these features mean less frequent maintenance.

When service or alteration is required either because of wear or change of application, Clark Type "CY" design makes the work easier and much faster. All parts are readily accessible from the front—screw-driver and wrench are the only tools needed. Service kits are available for all replacements. Times shown below include all operations, starting with a wired unit in a cabinet. The starter illustrated is Size 2, but servicing other sizes is correspondingly simple.

INSPECT CONTACTS AND SPRINGS



Simply open snap-action clips to release lower arc shield, exposing all contact surfaces to view. Replace arc shield after inspection. No tools required. Contact springs are in view at all times.

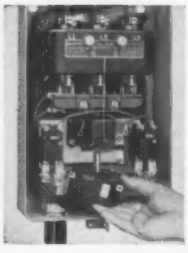
TIME—10 SECONDS

REPLACE CONTACTS AND SPRINGS

Loosen two captive screws holding movable contact arm in place. Release lower arc shield by opening snap-action clips. Remove contact arm and lower arc shield together. Movable contacts are removed by a simple twist to depress springs. Remove springs. Stationary contacts are loosened with a wrench. Reverse operations for installing new springs and contacts.

TIME—2½ MINUTES

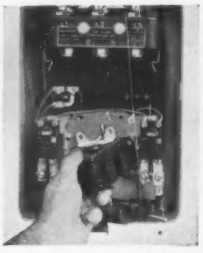
REPLACE COIL



Remove snap-in pin to release armature. Remove coil connections. Remove coil clamps held by two captive screws. Coil drops free. Reverse operation for replacement.

TIME—2 MINUTES

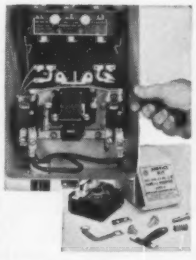
REPLACE MAGNET ASSEMBLY



Remove contact arm. Remove armature and coil. Take out 4 holding screws and lift out magnet. Reverse operation for installing new magnet assembly.

TIME—4½ MINUTES

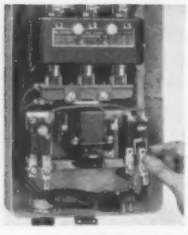
ADD CONTROL CIRCUIT CONTACT



Remove main contact arm. Attach new control circuit block with stationary contacts to base plate (one screw). Mount movable control circuit contact and spring on main contact arm (one screw). Reassemble.

TIME (Exclusive of Wiring)—1½ MINUTES

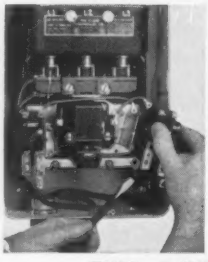
CHANGE OVERLOAD HEATER COILS



Remove overload relay cover plate held by one captive screw. Remove 2 connection screws and take out heater coil. Reverse operation for installing new coil.

TIME—2½ MINUTES
(Total for replacing both coils)

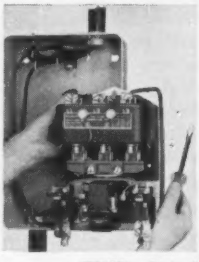
REPLACE OVERLOAD RELAY



Disconnect wiring and take out 2 screws holding relay mounting bracket to base plate. Remove old relay from mounting bracket. Reverse operation for replacement.

TIME—4 MINUTES

REMOVE STARTER FROM CABINET



Disconnect external wiring. Loosen or remove 3 screws holding starter to base plate (Note: on size 2 and smaller, all screw holes are slotted and screws need only be loosened). Lift starter from cabinet.

TIME—1½ MINUTES

Clark Type "CY" AC Magnetic Starters are now available in sizes 0 through 4.
For complete information contact your nearest Clark distributor or sales office, or write us direct.

The **CLARK** **CONTROLLER** *Company*

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Going up...

with a lift from FRASSE stock tubing!

Courtesy: Industrial Service Co.

Faced with an almost impossible delivery deadline, the maker of this hydraulic elevator needed a 6" OD ram and a 5" OD ram to telescope. Then too, he knew that final sizing would consume valuable time. With Shelby seamless tubing specified – and speed essential . . . he put in a hurried call to Frasse.

Frasse not only made delivery *immediately* from stock—but was able to *select*, from commercial tolerance material, two tubes so close to final size that only minor honing and turning were necessary. This lift from Frasse stock tubing enabled the elevator to be completely installed, approved . . . *and in operation*, days sooner than had been anticipated.

Tubing stocks at Frasse are in good supply – and quick Frasse delivery helps you get jobs done faster. So, depend on a dependable tubing source – *call Frasse* whenever you need mechanical tubing, stainless tubing, hydraulic and pressure tubing, centrifugally spun tubing – or even a bit of assistance from Frasse tubing specialists. They'll be happy to work with you on any problem involving a tubular product.

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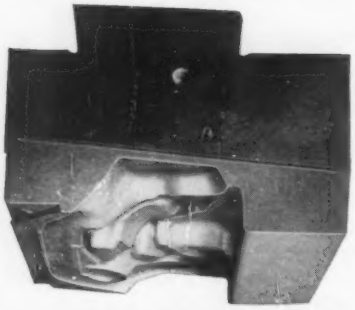

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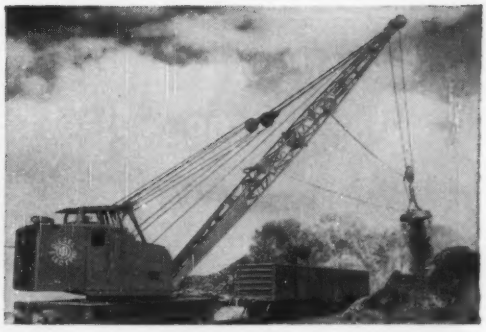
HOW THE ELECTRIC ROTATING MECHANISM IN I. B. LOCOMOTIVE CRANES increases operating speed and efficiency



Wherever crane rotation is unusually severe (magnet and bucket operations), an electric rotation unit (optional at extra cost) can be supplied with Industrial Brownhoist Cranes. The savings in maintenance and the greater efficiency plus the elimination of friction clutches offset the cost in a short time. The generator in the electric rotating motor is large enough to supply power for magnet service, and the complete rotation mechanism is easily accessible, being mounted on the top of the rotation bed. Reversing the flow of current through the motor, quickly and smoothly reverses the direction of rotation. • The carbody, trucks, monitor-type cab, and machinery arrangement of I. B. equipment have been equally well engineered. Write for Catalog No. 548 for complete information.

- PUSH BUTTON MAGNET CONTROL
- ROTATING CONTROLLER
- SAFE WORM DRIVEN BOOM HOIST
- AUTOMATIC BOOM HOIST BRAKE
- DYNAMIC CLUTCH AND CONTROLLER
- ELECTRIC ROTATION GEAR REDUCTION UNITS MOUNTED ON ANTI-FRICTION BEARINGS (HERE SHOWN WITH OIL CASES REMOVED)
- 1500-WATT BATTERY GENERATOR FOR STARTING AND NIGHT LIGHTING EQUIPMENT
- ROTATING MOTOR
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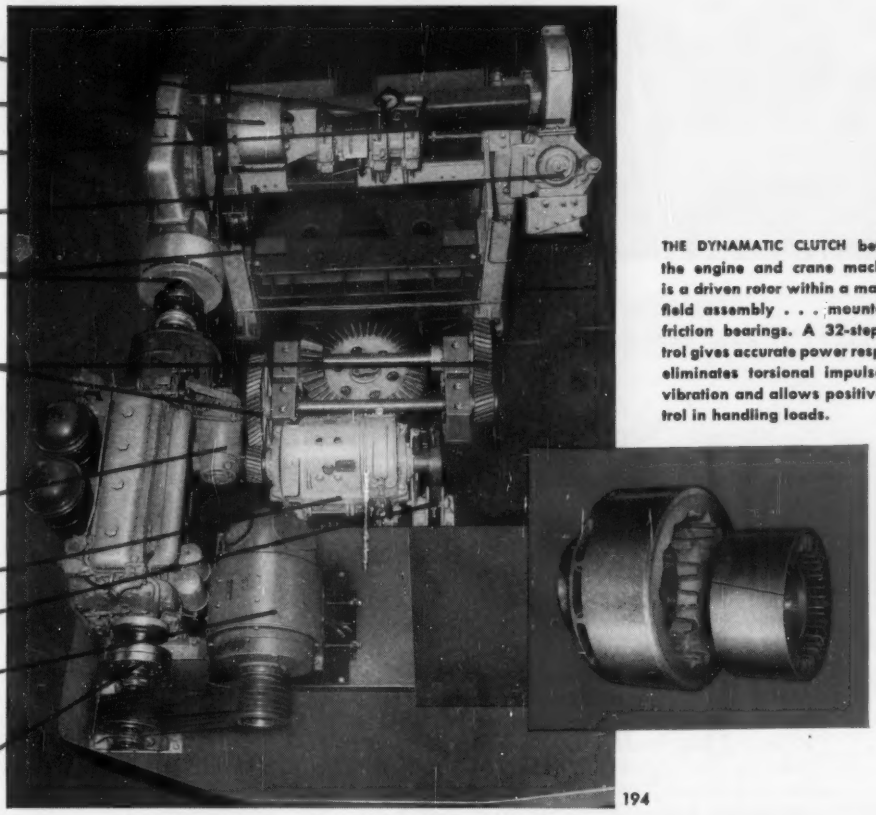
- ROTATING AND MAGNET GENERATOR SUPPLIES CONSTANT VOLTAGE
- FLEXIBLE COUPLING



THE DYNAMATIC CLUTCH between the engine and crane machinery is a driven rotor within a magnetic field assembly . . . mounted on friction bearings. A 32-step control gives accurate power response, eliminates torsional impulse and vibration and allows positive control in handling loads.

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Report on Research and Development at Erie Forge & Steel Corporation

Shaft is rotating during non-destructive sonic test

No Defects In This 75,000 Pound Forging

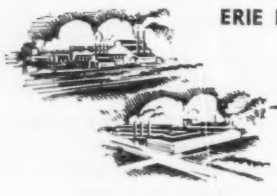
Today's demands by the electrical industry for large rotor forgings free of unsound metal are met at Erie Forge & Steel Corporation by a continuing research, testing and development program.

For example, this 75,000 pound rotor forging is being tested by the Ultrasonic Reflectoscope, a test so sensitive that it will expose structural defects of microscopic size. Even under so rigorous a test, this huge forging showed *no defects*.

Through the years our continuously expanding program of Research and Development, keeping abreast of progress in the metal industry, has resulted in the use of the most modern techniques in the Open Hearth, Forging, Heat Treating and Quality Control Divisions. Under direction of our Metallurgical Department we are producing:

- Cleaner, sound ingots
- Control of phosphorus and sulphur
- Maximum elimination of hydrogen in steel making
- Ingot mould design and solidification characteristics
- New compositions with greater ductility, notch toughness
- Accurate temperature control in melting, forging, treating
- New forging techniques to insure metal soundness
- Improved concepts in testing and evaluating quality

Another example of the advantages of one responsibility and one control.



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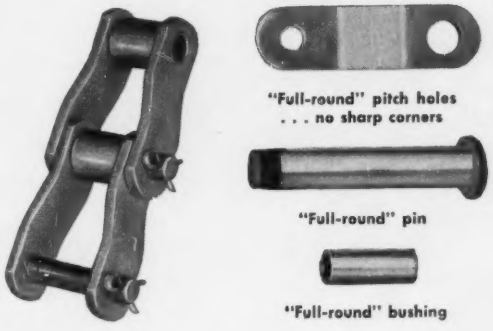
"Stress raisers" eliminated by Link-Belt LXS chain design

LXS "FULL-ROUND" DESIGN



"FULL-ROUND" DESIGN eliminates stress concentration points. Heat treatment of all parts adds even greater strength and extra wear life to selected steels. Accurate control of these processes avoids brittleness, poor wear values and low tensile strengths . . . and assures uniformity.

Large pins, bushings mean ample live bearing area for long life

For long life under severe conveyor and drive conditions, Link-Belt LXS chain provides extra strength, increased wear resistance and wider application flexibility. This fabricated steel roller chain incorporates many advanced design and manufacturing refinements, resulting in superior ruggedness and accuracy.

Eliminate weak points

"Full-round" design does away with stress concentration points most frequently subject to failure . . . provides maximum live bearing area between pin, bushing and sidebars. As a result, stress is distributed evenly, increasing chain life.

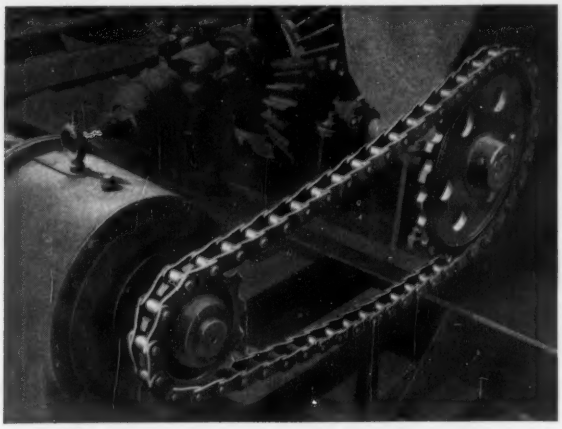
Pins and bushings are accurately sized for controlled press fit, preventing rotation in sidebars. Made from selected bar steel, sidebars are carefully machined for proper pitch hole size and for maintaining firm, tight press fit of pins and bushings. This assures close control of pitch and proper chain length after assembly.

Hardening extends life

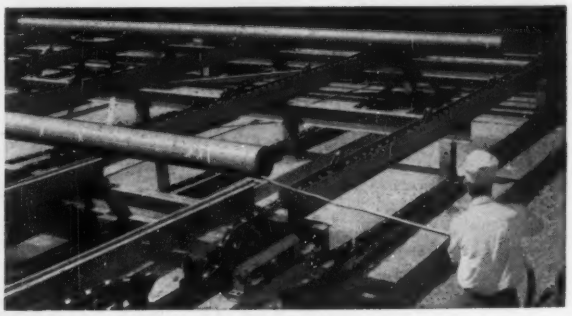
Another Link-Belt long-life extra is the controlled hardening of selected steels used in the manufacture of LXS chain. Pins, for example, are made from a tough steel, specially treated for high strength in shear and for maximum wear value. Bushings are properly hardened to shrug off shock and resist wear.

Rollers are accurately machined to assure proper operating clearances and free-rolling action. Controlled hardening gives them the necessary resiliency and durability.

LXS especially popular for exposed drives, high impacts



Link-Belt LXS chain is the long-life answer for exposed drives, abrasive and high-impact conditions. Its large, live bearing area reduces cutting action of abrasives because load is spread over a broad area.



LXS chain provides extra strength, wear-life for heavy-duty conveying

Link-Belt LXS chain has real stamina—as shown in this conveyor application for handling 1000-pound, 40-foot lengths of steel pipe. Thanks to accuracy of pitch and attachment spacing, plus close matching of multiple strands, LXS has the added strength and wear life for the extra-long conveyors so popular in today's move to mechanization.

HEADQUARTERS for chains, sprockets and other Link-Belt conveying and mechanical power transmission products is your nearby Link-Belt factory branch store or authorized stock-carrying distributor.

LINK-BELT

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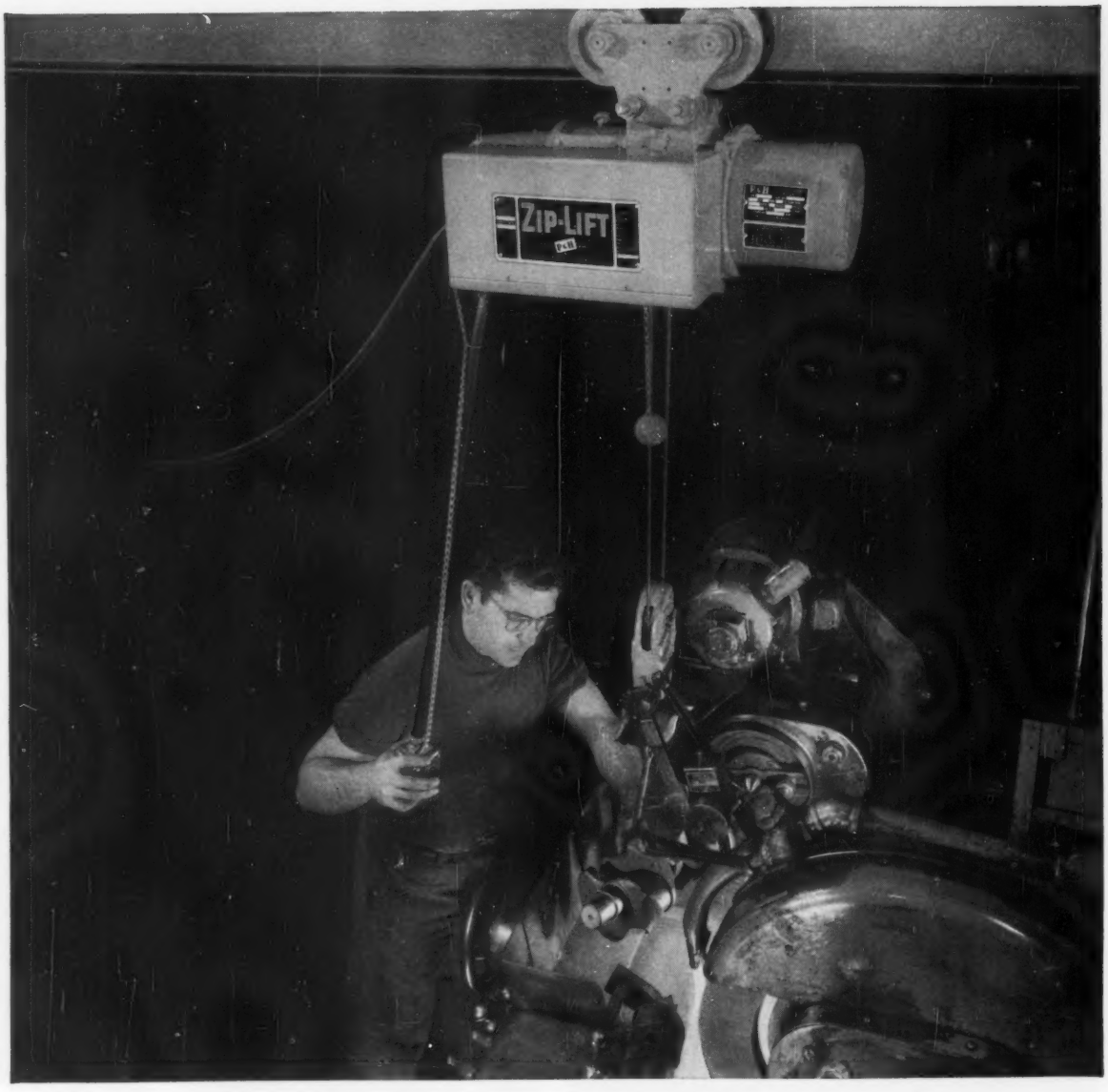

"77% greater production using P&H Zip-Lift Hoists"

—reports Wisconsin Motor Corporation

Outstanding production increase coupled with maximum safety

Production rates were boosted and work eased when P&H Zip-Lift® hoists were installed at The Wisconsin Motor Corporation. For example, on one operation, crankshaft milling, "—average output was 15 pieces an hour at a labor cost of 21¢ per piece. Now, using one P&H Zip-Lift, production has increased to 26½ pieces per hour — or 77%. We save 9¢ per piece on labor alone, or $16.66 on each 7-hour shift."

Other records reveal similar increased efficiency and safety wherever each of the 9 Zip-Lifts used by this company is located.

P&H top performance is coupled with maximum safety. In over three years operation, Wisconsin Motors has never had an accident with a P&H Zip-Lift. What's more, the press of a button replaces manual lifting . . . eases labor . . . lowers fatigue.

Find out how P&H Zip-Lift electric hoists can help save you time, labor, and money. Write today for Bulletin H-20. Department 206B, Harnischfeger Corporation, Miiwaukee 46, Wisconsin.

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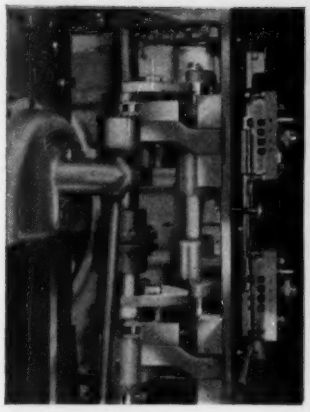
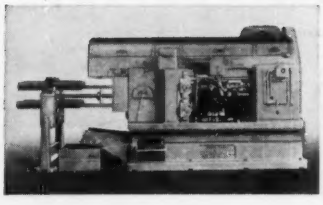


Conomatics Provide Radial Screw Adjustment of Forming Tool Slides

- Models 2⅝" LA, 3½" AD, 5" KL, and 5¼" KR Conomatic Four Spindle Bar Machines are equipped with a number of quick job-change features. One of these is the all-position end attachment drive for the mounting of endworking opposed spindles in all positions, with independent feed to as many as three opposed spindles on a single setup.

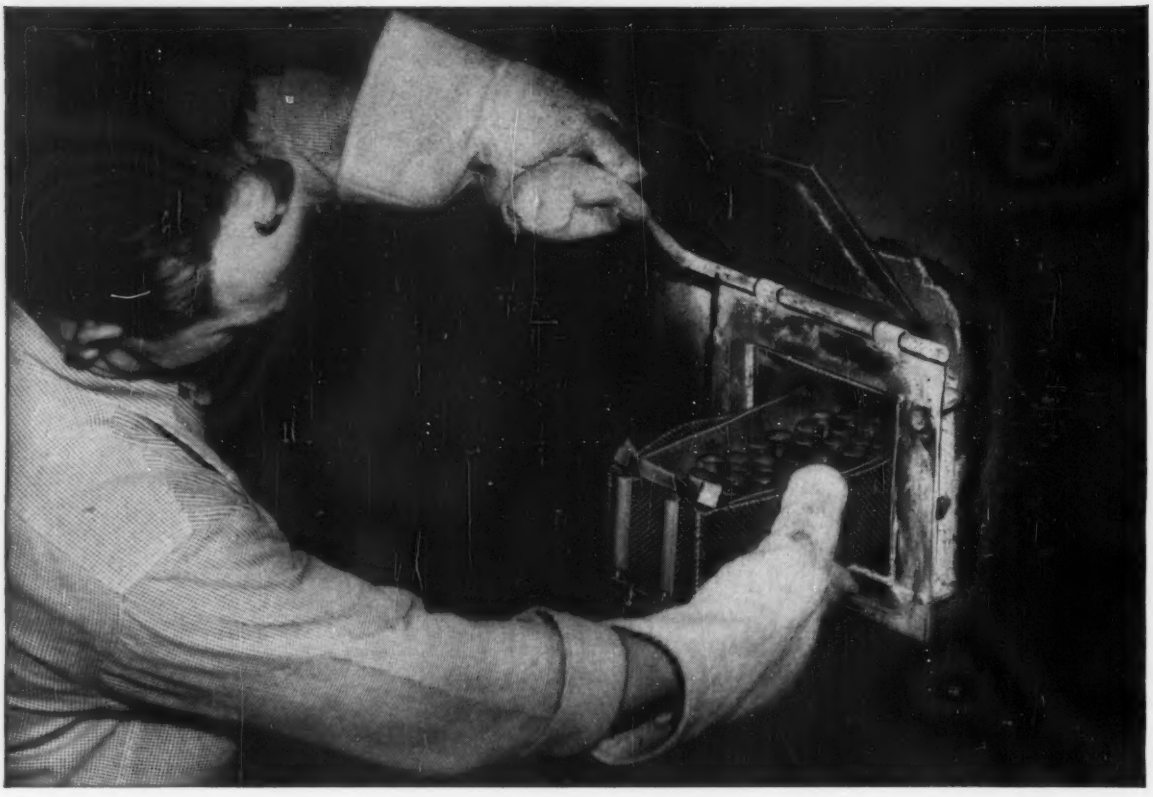
Another feature that is of considerable importance in tooling up is the radial screw adjustment of all sideworking slides. Trial cuts may be taken to correct diameters with form tools without changing the clamped positions of the form tool holders.

All Conomatic quick changeover models are equipped with dial adjustment of the working stroke of all tool carrying slides. Besides the Four Spindle machines there are three quick change Six Spindle models in 9/16", 1" and 1⅝" sizes. Write, wire, or phone for literature.



Conomatic

CONE AUTOMATIC MACHINE COMPANY, INC., WINDSOR, VT., U. S. A.



720 Hours at 2300 Deg. F ...Didn't Hurt This Muffle

Continuous exposure at 2300 deg. F had little effect on a muffle made of HASTELLOY alloy X and used in this electric annealing furnace. The muffle was subjected to the intense heat for an entire month, 24 hours a day. After this extended service it was examined, found to be in excellent condition, and put back in service.

Actually, HASTELLOY alloy X solved a dual problem for this Company. The muffle is used in a furnace for annealing cold-drawn parts. Periodically, it is used for annealing superalloy parts at 2300 deg. F. Most of the time, however, it is used to anneal stainless steel parts at lower temperatures. Other materials were either inadequate for this service or too costly. Only HASTELLOY alloy X could handle both conditions economically.

HASTELLOY alloy X is a wrought high-temperature alloy with excellent strength and oxidation resistance to 2300 deg. F. For a copy of a booklet describing HASTELLOY alloy X, get in touch with the nearest sales office listed below.

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HAYNES STELLITE COMPANY

A Division of Union Carbide and Carbon Corporation

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"Haynes" and "Hastelloy" are registered trade-marks of Union Carbide and Carbon Corporation.

CALENDAR
OF MEETINGS

May 6-8, Air Conditioning & Refrigeration Institute: Annual meeting, Homestead, Hot Springs, Va. Institute's address: 1346 Connecticut Ave. N.W., Washington, D. C. Managing director: George S. Jones Jr.

May 6-10, American Foundrymen's Society: Annual meeting and first engineered castings show, Music Hall, Cincinnati. Society's address: Golf and Wolf roads, Des Plaines, Ill. Secretary: William W. Maloney.

May 7-12, National Association of Architectural Metal Manufacturers: Annual convention, Fairmont hotel, San Francisco, Calif. Executive secretary: William N. Wilson.

May 8-10, American Management Association: Spring insurance conference, Hotel Statler, New York. Association's address: 1515 Broadway, New York 36, N. Y. Secretary: Andrew P. Donovan.

May 8-10, American Steel Warehouse Association: Annual meeting, Roosevelt hotel, New Orleans. Association's address: 442 Terminal Tower, Cleveland 13, O. Executive secretary: Robert G. Welch.

May 12-15, Automotive Engine Rebuilders Association: Annual convention, Sheraton-Cadillac hotel, Detroit. Association's address: 419 N. Capitol Ave., Indianapolis 4, Ind. Executive vice president: R. C. Patterson.

May 12-15, Liquefied Petroleum Gas Association Inc.: Annual meeting and exhibit, Conrad Hilton hotel, Chicago. Association's address: 11 S. LaSalle St., Chicago 3, Ill. Secretary: Arthur C. Kreutzer.

May 12-16, Electrochemical Society Inc.: Spring meeting, Hotel Statler, Washington. Society's address: 216 W. 102nd St., New York 25, N. Y. Secretary: Henry B. Linford.

May 13-15, Rail Steel Bar Association: Annual meeting, Broadmoor hotel, Colorado Springs, Colo. Association's address: 38 S. Dearborn St., Chicago 3, Ill. Secretary: W. H. Jacobs.

May 13-16, National Welding Supply Association: Annual meeting, Mayflower hotel, Washington. Association's address: 1900 Arch St., Philadelphia 3, Pa. Secretary: R. C. Fernley.

May 13-16, American Mining Congress: Coal convention and exposition, Public Auditorium, Cleveland. Congress' address: 1102 Ring Bldg., Washington 6, D. C. Executive vice president and secretary: Julian D. Conover.

May 14-16, Industrial Nuclear Technology Conference: Museum of Science and Industry, Chicago. Sponsors: Armour Research Foundation of Illinois Institute of Technology and *Nucleonics* magazine. Information: Dr. Leonard Reiffel, Armour Research Foundation, 10 W. 35th St., Chicago 16, Ill.

May 15-17, National Association of Sheet Metal Distributors: Spring meeting, Warwick hotel, Philadelphia. Association's address: 1900 Arch St., Philadelphia 3, Pa. Secretary: Thomas A. Fernley Jr.

May 15-17, Radio-Electronics-Television Manufacturers Association: Annual meeting, Sheraton hotel, Chicago. Association's address: 777 14th St. N.W., Washington 5, D. C. Secretary: James D. Secrest.

May 16-17, American Management Association: Special marketing conference, LaSalle hotel, Chicago. Association's address: 1515 Broadway, New York 17, N. Y. Secretary: Andrew P. Donovan.

May 16-17, National Industrial Conference Board: Annual meeting, Waldorf-Astoria hotel, New York. Board's address: 460 Park Ave., New York 22, N. Y. Secretary: Herbert S. Briggs.

May 16-18, New York State Society of Professional Engineers: Engineering industries exposition and convention, Hotel Statler, New York. Society's address: 1941 Grand Central Terminal Bldg., New York 17, N. Y.

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Malleabrasive reduces overall cleaning costs as much as 50% because—
• It wears 2 to 4 times longer than ordinary shot and grit.
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These are not just claims. You can prove these savings right in your own plant, in your own machines. We supply all the necessary forms and instructions.
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In easy to handle 50-pound Double Burlap Bags.
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Columbia-Southern Trichlor is a quality product, made to extremely rigid laboratory standards. It is available in tank cars, tank trucks and drums. Order yours today from your nearest Columbia-Southern sales office or from your solvents distributor.

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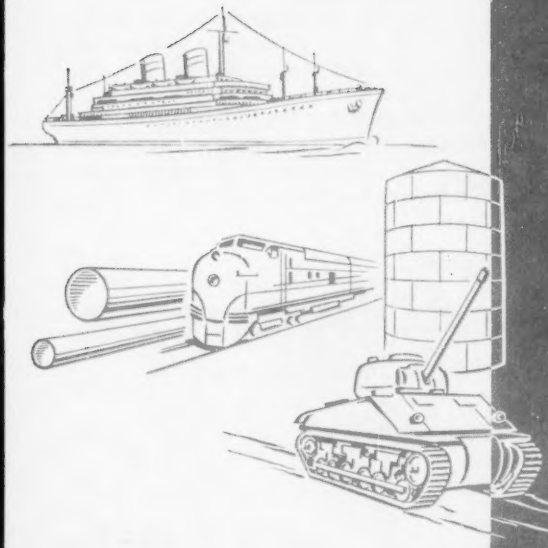

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UNITED *can serve you no matter where in the world you are.*

500 Stock Sizes of Ledaloyl Self-Lubricating Bearings

With stock Ledaloyl self-lubricating bearings you can enjoy the advantages of economy and quick delivery and still have a wide latitude in design. Plain cylindrical, flanged and spherical self-aligning types are available with various ID's, OD's and lengths. Engineers find that in many applications the standard composition and size tolerances are ideal for their products.

Johnson stock Ledaloyl bearings will function efficiently in hundreds of different applications. Oil is retained in the pores of the bearing and metered out to the shaft when it is in motion, eliminating the need for an expensive and bulky lubricating system. In many cases the bearing will provide adequate lubrication for the life of the product without adding to the original oil content.

If you are interested in obtaining complete details on the advantages of stock Ledaloyl self-lubricating bearings or any of the many other types of Johnson sleeve bearings consult your Johnson distributor or write for our catalog.

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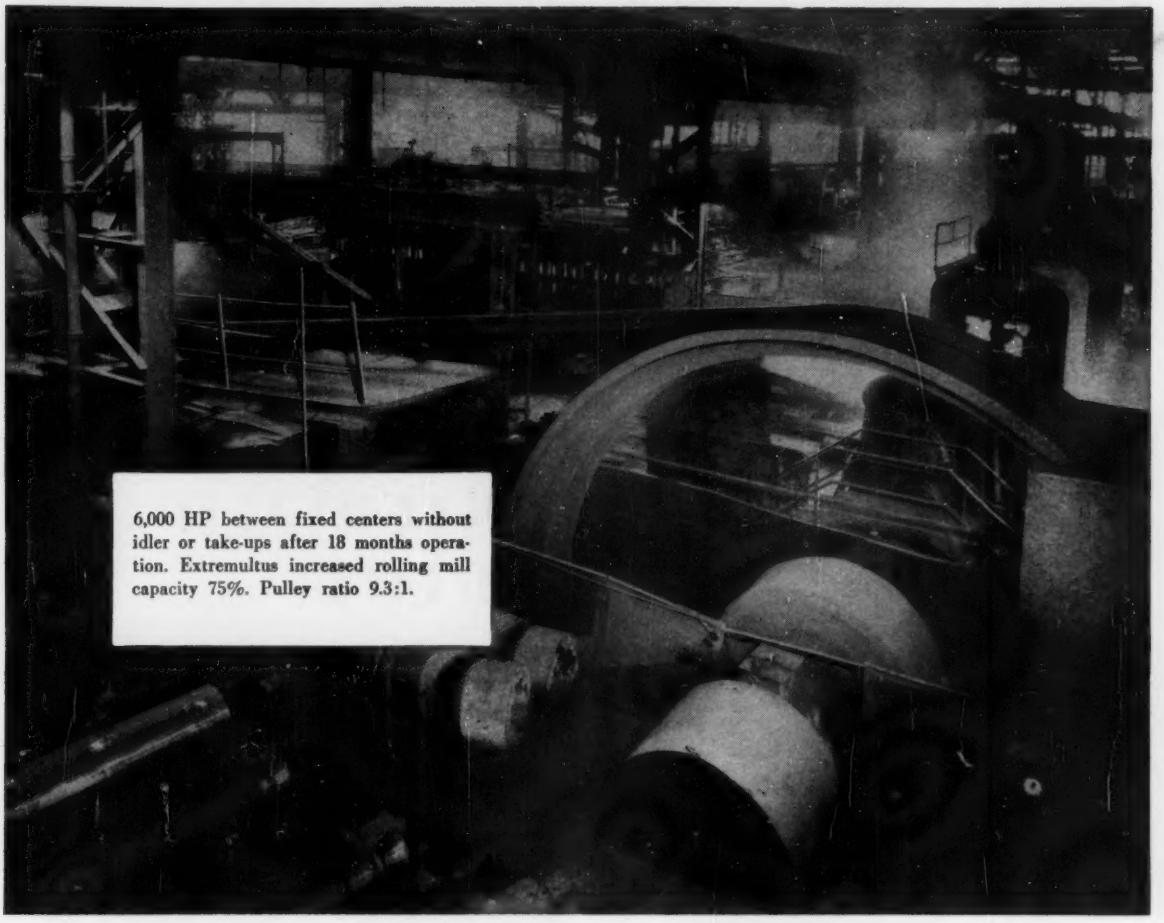
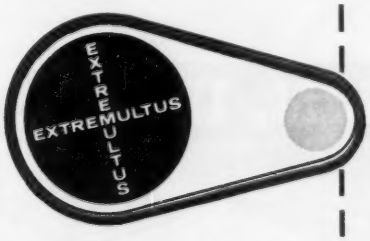


6,000 HP between fixed centers without idler or take-ups after 18 months operation. Extremultus increased rolling mill capacity 75%. Pulley ratio 9.3:1.

This Belt Drive Transmits 6,000 HP

The rolling mill installation shown above is typical of the "impossible" belting problems which EXTREMULTUS solves with ease. This new belt, a combination of leather and plastic, is out-performing and replacing existing V-belts, chains and flat belts everywhere! EXTREMULTUS permits speeds to 10,000 ft. per min., ratios as high as 20:1, arcs of contact as low as 90°, unexcelled elasticity and shock absorption, a range from 1/10 to 6,000 HP! In addition, EXTREMULTUS requires widths a fraction of belts replaced, eliminates take-up because of its freedom from stretch, needs no idlers yet operates on standard pulleys! Write today for full information for the EXTREMULTUS answer to *your* toughest drive problem!



EXTREMULTUS, INC.
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sets the pace for production of top quality machine parts

You can maintain the maximum output of your automatics by utilizing the high machining rates that are available to you with Bliss & Laughlin's

LUSTERIZED LEDLOY
Cold Finished Bars

These modern steels show wide gains over ordinary screw stocks . . . 45% to 60% faster. than B-1113 . . . and as much as 100% over C-1117 or similar grades.

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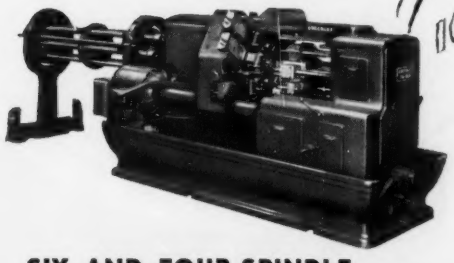
GREENLEE Automatic Bar Machines



BOOST PRODUCTION
REDUCE DOWN TIME

It's easy to maintain rigid production schedules . . . prevent costly bottlenecks with Greenlee Bar Automatics. They are always on the job . . . give continuous, reliable service.

You hear much comment about Greenlees' uninterrupted, round-the-clock performance in widely different industries. With good reason, too, for Greenlee offers years of manufacturing experience... plus manufacturing integrity not often duplicated.

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SIX AND FOUR-SPINDLE AUTOMATIC BAR MACHINES

GREENLEE Special Machine Tools

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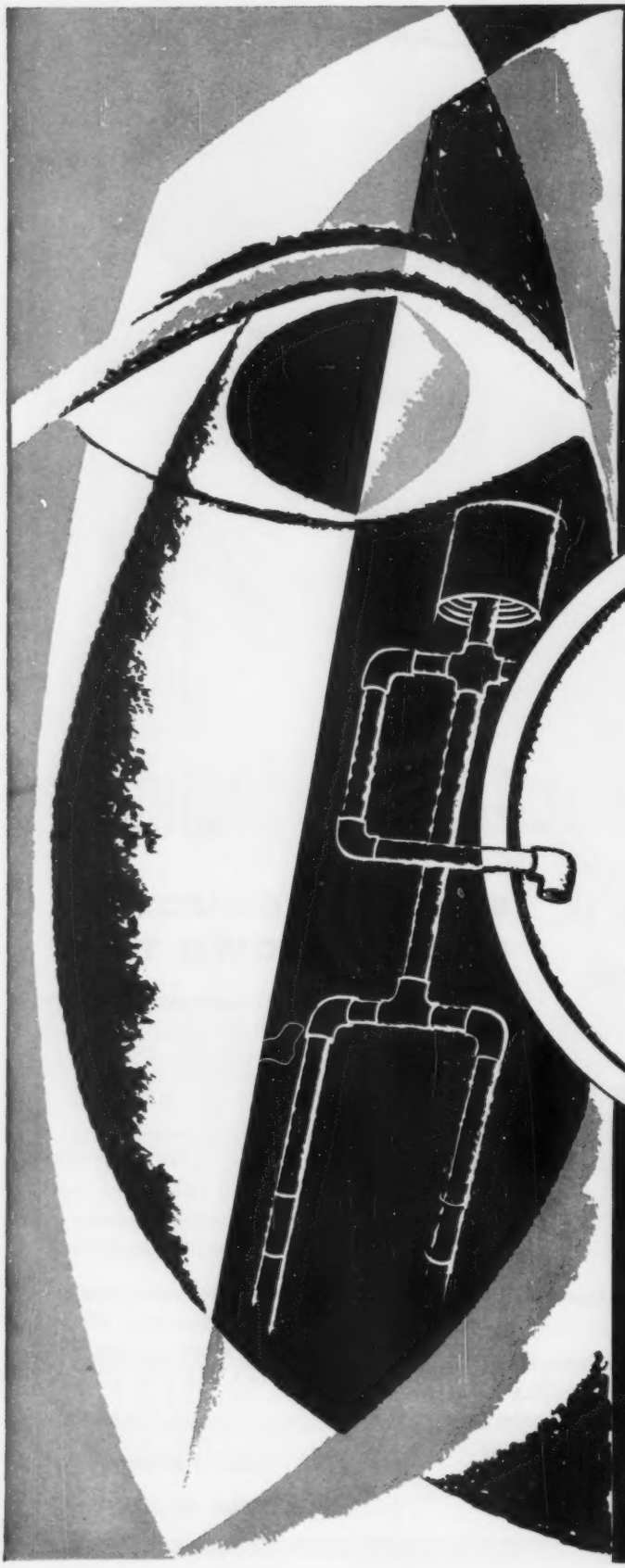

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keeps its eye on quality!

From skelp to shipment—perfection is never an accident. It's always the result of painstaking attention to detail. Wheatland keeps its eye on quality by inspection from start to finish. Each length of steel pipe is carefully inspected for ability to withstand pressure, perfection of threading, secureness of welds.

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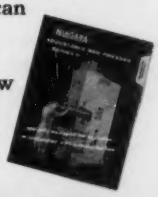
specialized, stylized, modernized for automotive and appliance industries

THE LATEST WORD IN ADJUSTABLE BED PRESSES

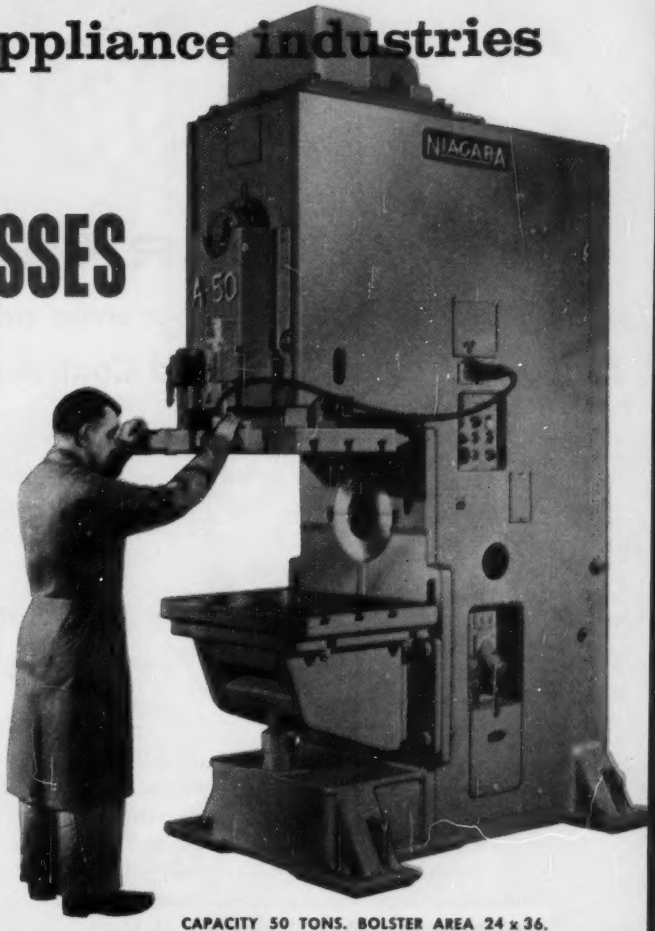
Trim, compact and versatile — this is Niagara's brand new version of its Adjustable Bed Press for the mass production industries. Designed for secondary operations between automated presses in the production line, it embodies specialized features for automotive and appliance manufacturers.

Everything about this press is geared to promote faster, safer and more efficient operation . . . the smooth streamlined exterior of its modern front-to-back crankshaft design . . . absence of overhanging and protruding parts . . . complete drive (gears, flywheel, air friction clutch and brake) fully enclosed within frame . . . up-to-the-minute controls and devices neatly recessed in the frame or completely housed behind flush panel doors.

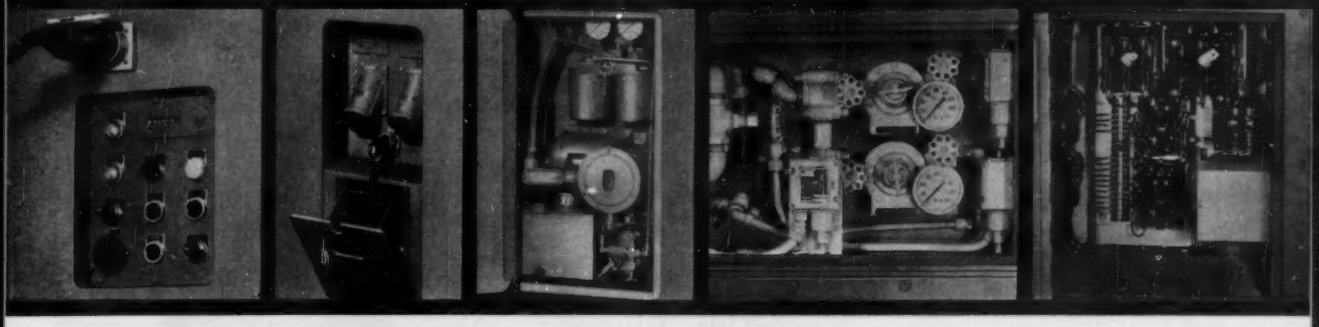
Examine it. No press in this category can match such a combination of design and operating features . . . such space-saving compactness. It's easily moved too! With lifting lug and skid type feet, you can readily hoist or pull this press to any location within your plant.



WRITE TODAY for full details on this new model, as well as the complete standard line of Niagara Adjustable Bed Presses . . . (14 to 150 ton capacities). Request new Supplement and Bulletin 60E.



CAPACITY 50 TONS. BOLSTER AREA 24 x 36.



OPERATOR'S PANEL features deluxe controls conveniently arranged for fingertip direction of press operations.

AUX. POWER SUPPLY & SAFETY BLOCK. Receptacles (440V. and 110V.) for automatic equipment, conveyors, portable tools, etc. Safety plug, chained to safety block, de-energizes entire press control when removed from receptacle.

AUTOMATIC OIL CIRCULATING SYSTEM sends clean, filtered, metered flow of oil to all bearings and gears in crown, air counterbalance, slide gibs and barrel adjustment. Correct operating oil pressure is maintained, or press stops automatically.

AIR CONTROL PANEL houses air line filter, pressure regulators, gauges, blow-off valves for clutch and counterbalance, flywheel brake and motor cutout switch behind dust-tight door.

COMB. MOTOR & PRESS CONTROL in dust-tight enclosure flush mounted in rear frame, houses disconnect switches, circuit protection, transformers, fuses, control relays and starters for main motor and lubrication pump.

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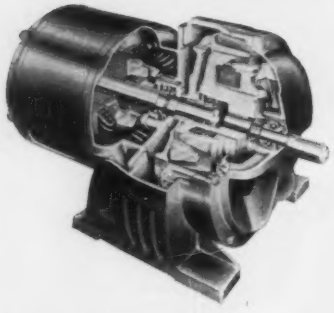
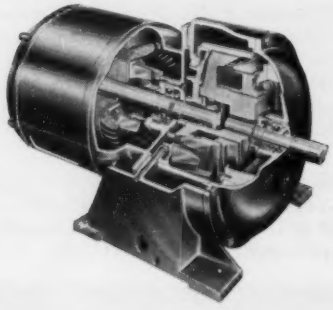


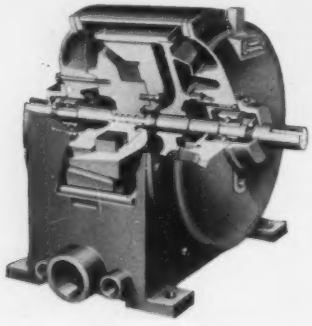
Ajusto-Spede® Drives

Dynamatic Ajusto-Spede® Drives supply infinitely adjustable speed from an AC power source—with low power losses and minimum maintenance. These air-cooled, stationary field, eddy-current couplings, integrally mounted with standard D-flange AC induction motors, provide a complete package-drive in sizes from 3 HP to 75 HP. Units of the same design and capacities are also available without motors.

Dynaspede® Drives

These Dynamatic liquid-cooled, adjustable speed, Eddy-Current Couplings, integrally mounted with standard D-flange AC induction motors provide a compact self-contained drive in sizes from 3 HP to 75 HP. Motor types available are drip proof, totally enclosed fan cooled, and explosion proof. The coupling is completely enclosed. Separately mounted couplings are also available in capacities from 3 to 2500 HP and larger.



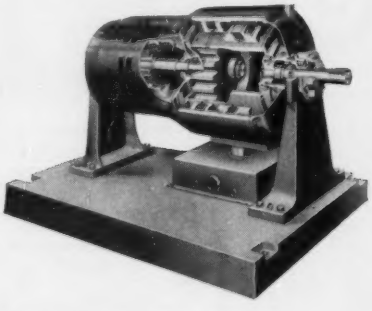


Eddy-Current Brakes

Dynamatic Eddy-Current Brakes are available in a wide range of torque capacities and operating speeds. Features include smooth, frictionless, shock-free operation with no rotating electrical components or contacts. Liquid-cooled types, as illustrated, provide loading requirements from 40 HP to 10,000 HP. Air-cooled units are available in sizes up to 50 HP.

Dynamometers

Three types of Dynamatic Eddy-Current Dynamometers are available to meet various testing requirements; absorption dynamometers up to 15,000 HP; motoring or driving dynamometers up to 500 HP; and universal dynamometers to 500 HP and larger. Special purpose dynamometers are also designed for use in applications where requirements are unusual.



Send for Illustrated Literature Covering these Dynamatic Units

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ONE OF THE GARLOCK 2,000

Wet and Dry Tests Prove...

GARLOCK 662 GASKET MATERIAL
does not shrink or change shape

Here's convincing proof that gaskets of Garlock 662 can stand varying climatic conditions without drying, shrinking, or hardening. The gaskets illustrated were subjected to a 24-hour alternating wet and dry test for weeks, then conditioned at room temperature. As the photo and chart at right show, 662 gaskets returned to their original shape and to within 1% of their original thickness. Competitive types hardened, twisted, and shrank as much as 8%. No wonder so many companies are specifying 662 for use against gasoline, water, and oil at temperatures up to 300°F. It is approved by Underwriters' Laboratories, Inc., for use against hazardous liquids.

And longer-lasting 662 Gasket material is only one of "the Garlock 2,000" . . . two thousand styles of gaskets, packings, and seals to meet all your needs. It's the only complete line. It's one reason you get unbiased recommendations from your Garlock representative.

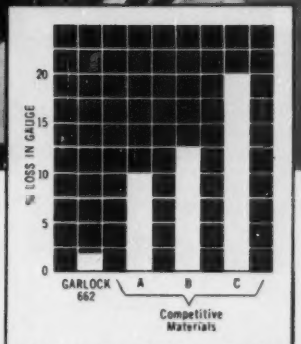

Chart shows loss of thickness after alternating wet and dry exposure tests. Garlock 662 returns to within 1% of original thickness. You can make these tests yourself. You'll prove that No. 662, made from a cork paper base impregnated with a synthetic rubber, is dimensionally more stable than competitive products.

Write for this folder AD-159 which completely describes how these Wet and Dry Tests were made . . . it also contains actual samples of 662 Gasket material before and after testing.

THE GARLOCK PACKING COMPANY, Palmyra, New York

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Packings, Gaskets, Oil Seals, Mechanical Seals, Rubber Expansion Joints, Fluorocarbon Products

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makes parts like these last longer

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ROCK CRUSHER

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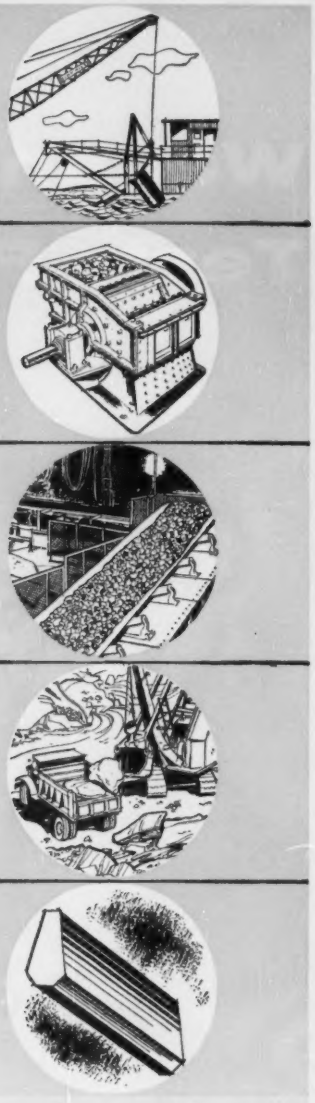
WEAR PLATE

GROUSER BARS



—keeps equipment on the job

Max-Wear Alloy Steel (13% manganese, 2% nickel) is *work hardening!* This means the more it's used the harder the surface becomes (up to 500/550 BHN). But only the surface hardens; the interior of the steel is unaffected. As a result, Max-Wear parts have truly wear-resistant surfaces *plus* high strength and toughness internally.

When you make parts like those shown with Crucible Max-Wear, you reduce downtime, cut repair and replacement costs. For Max-Wear resists repeated heavy impacts and abrasion—just what you need on jobs where equipment takes a bad beating.

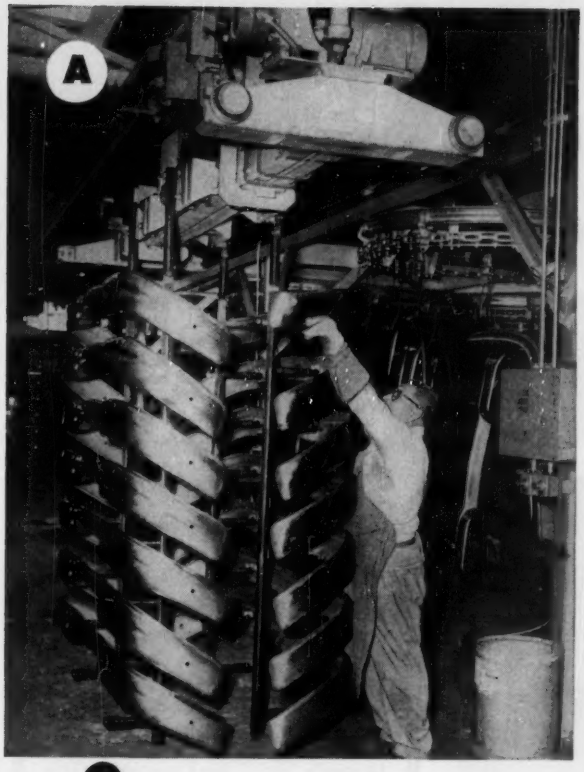
Crucible Max-Wear is especially practical for repairs in the field. It can be formed cold or at *red heat,* and is easily shear or torch cut and welded. No annealing is necessary after these operations—a big advantage in the field.

Max-Wear is now available in rounds, squares, plates and special grouser shapes. If you are looking for an easy-to-use alloy steel that will give you longer service under impact, wear and abrasion, try Crucible Max-Wear. *Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

See us at N.A.P.A. Inform-A-Show Atlantic City, May 26-29 Booths 1, 2, 3, 4.

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America



AMERICAN MONORAIL

teams with *Udylite*

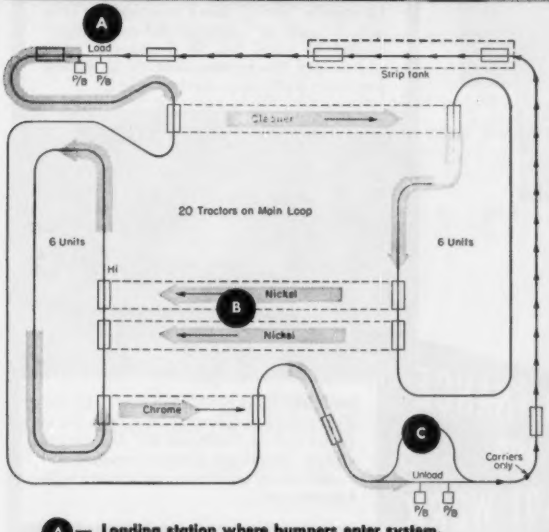
plates auto bumpers at Rheem Automotive plant

Combined engineering skills resulted in substantially reduced handling costs for the plating of auto bumpers at the new Rheem Automotive plant at Fullerton, California.

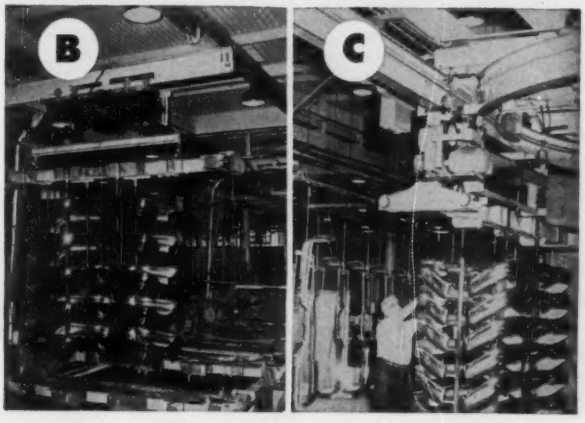
32 American MonoRail automatic dispatch units move special Udylite bumper carriers on three monorail systems with 14 drop sections to maintain continuous automatic plating.

Let American MonoRail engineers combine to solve your handling problems.

Write for Bulletin C-1.



A— Loading station where bumpers enter system.
B— Bumpers move through nickel tanks.
C— Inspection and unloading station.



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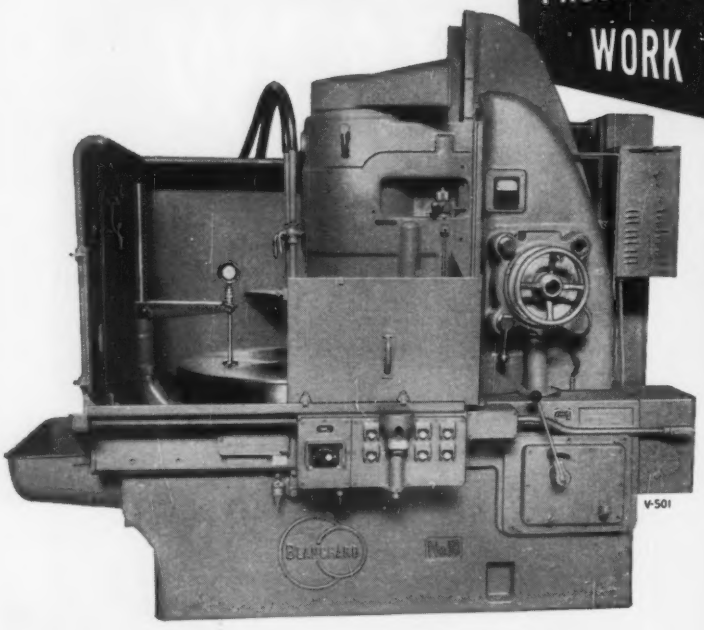
for BEST results in surface grinding...
PUT IT ON THE BLANCHARD

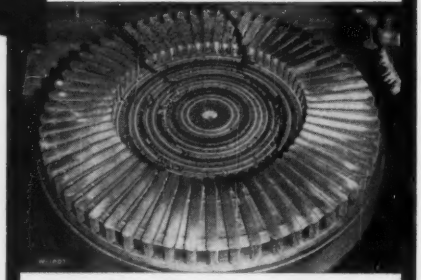
PRODUCTION WORK



Blanchard Grinders are used throughout industry on surface grinding jobs that demand the utmost in production, finish and accuracy.

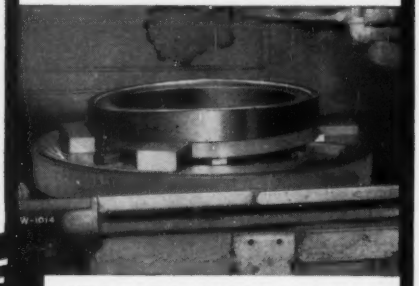
Whatever *you're* surface grinding, there's a Blanchard designed to do the job speedily and accurately.

SIDE PLATES. 9" x 18" plates ground from rough on No. 18 Blanchard with 36" chuck. Stock removal 1/16" to 1/8" per side. Held flat within .003", parallel to .001", and to dimension tolerance of ± .001". Production: 30 surfaces per hour.

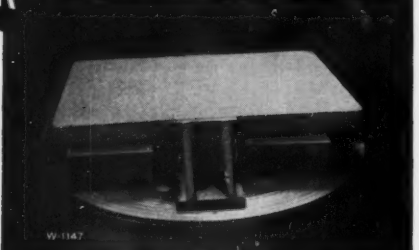


CONNECTING LEVERS. Cast iron levers ground in special magnetic fixture with pins located in "vee's". Stock removal per side is 1/32" to 1/16"; must be flat and at right angles to pins. No. 18 production: 180 pieces per hour, compared to 20 pieces per hour by former method used.

MAINTENANCE AND ODD LOT WORK



HARDENED STEEL PUNCHES. This 24-13/16" dia. punch, reground on a No. 18, is centered radially on 36" magnetic chuck. Duplicate circumferential and radial shear reliefs are generated with two setups.



GRANITE SURFACE PLATES. A No. 18 Blanchard reconditions this 18" x 34" granite surface plate by grinding it flat within .0002". 3/16" of stock is removed in 5 hours.

PUT IT ON THE **BLANCHARD**

Send for free copies of "Work done on the Blanchard", fifth edition, and "The Art of Blanchard Surface Grinding".

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A highly competent staff of metallurgical engineers is available for consultation. We welcome your inquiry.

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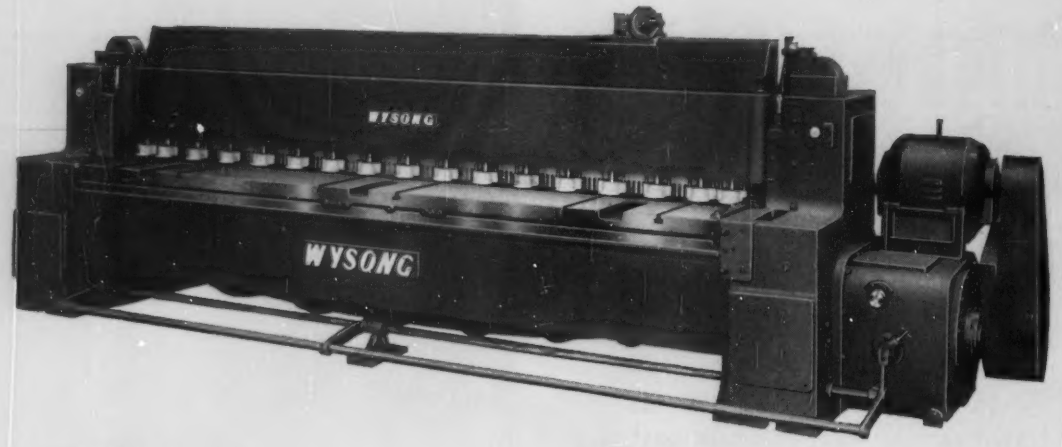

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mild steel, cutting length 12 feet.

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Simplicity of operation and superior design are keys to low maintenance and low down time.

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For greater accuracy, larger volume, easier operation and the finest in design — Buy a WYSONG . . . It's MILES Ahead!

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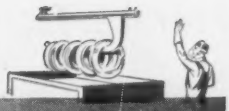

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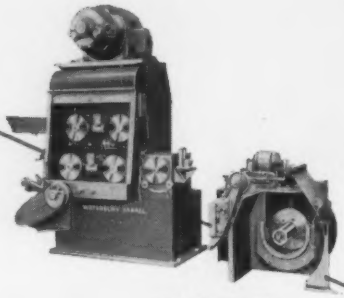
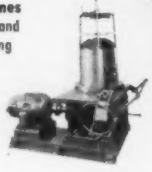


Upright Cone Wire Drawing Machines
For Intermediate and Fine Wire Drawing

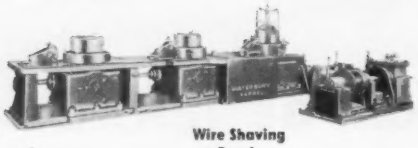
Horizontal Swagers

Rotary Swagers

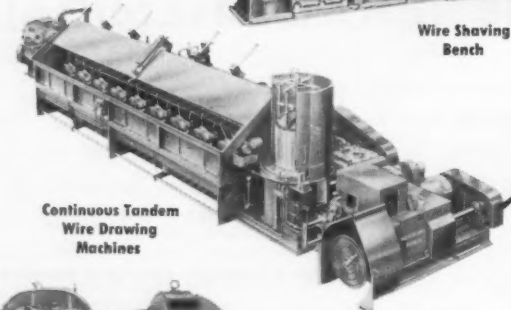


Vertical Bull Blocks

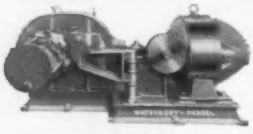
WF-35



Wire Shaving Bench



Continuous Tandem Wire Drawing Machines



Horizontal Bull Blocks

- BULL BLOCKS
- CONTINUOUS TANDEM WIRE DRAWING MACHINES
- HAND SWAGERS
- HORIZONTAL SWAGERS
- ROLL POINTING MACHINES
- ROTARY SWAGERS
- SLEEVE WIRE DRAWING MACHINES
- SPOOLERS
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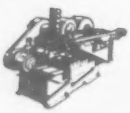
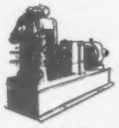
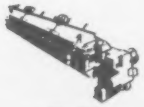


Bolt, Nut & Screw Machinery

Power Presses



Rolling Mill Machinery



Wire Mill Equipment

Sendzimir Mills and Other Special Machinery

AN EXAMPLE OF ALCHEMY

Transmutation of machine chips (background to foreground) from base steel to pure profit

The chips in the foreground aren't really gold – but they are the next best thing if you do extensive machining on circular forgings. They're Hi-Qua-Led Steel®. They are also the same grade steel as the chips in the background – 4140. You can see the great difference, but let us tell you something about it, too.

An initial production run in a customer's plant – using a Fellows gear shaper – produced both sets of chips. The regular 4140 steel forging had a Bhn of 285; the 41L40 Hi-Qua-Led Steel forging in the same grade had a Bhn of 285 to 293. Here are the results:

	4140 Steel	41L40 Hi-Qua-Led Steel
Roughing cut	50-60 sfm 0.0145 feed 0.530 depth of cut	80-85 sfm 0.0176 feed 0.533-0.538 depth of cut
Finish cut	50-60 sfm 0.0145 feed 0.033 depth of cut	100 sfm 0.0176 feed 0.025-0.030 depth of cut
State of finish	regular	super-finished
Total machining time	3½ hr average per gear (excluding down time for tool breakage)	2 hr average per gear (no tool breakage)

Machining time saved: 1½ hours or 43 per cent per gear. The savings shown in this particular test are typical of Hi-Qua-Led's performance in many applications. Further, when you use Hi-Qua-Led circular forgings you do not sacrifice any regular steel quality. Hi-Qua-Led in any AISI grade has the same attributes as regular steel of the same grade.

Investigate the possibilities of Hi-Qua-Led Steel in circular forgings from 18- to 145-in. OD. ALCO specialists will visit your plant to help you save the most from its machining potentials. Contact your nearest ALCO sales office, or write Spring & Forge Division, Dept. OCF-3, P. O. Box 1065, Schenectady 1, N. Y. for brochures.

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OF THE IMPORTANCE OF SPECIFYING

LYNCHBURG FOUNDRY

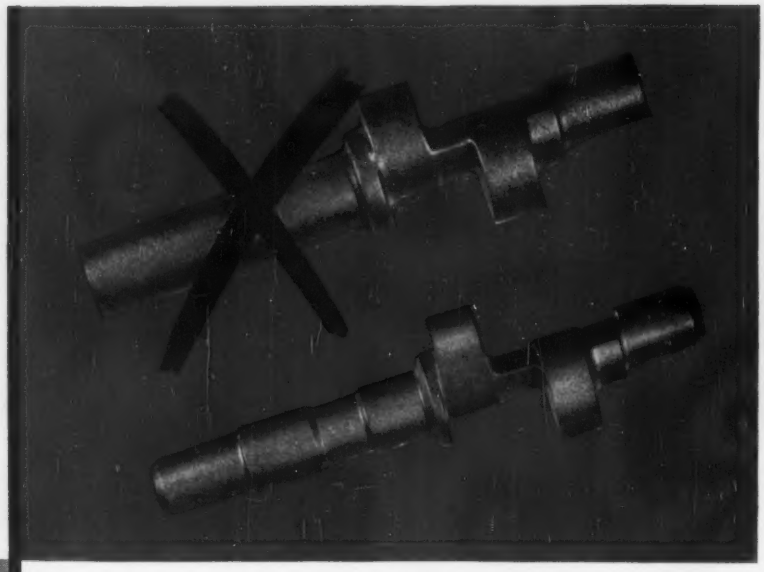
SHELL CASTINGS

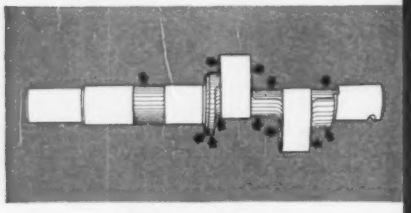
GREATER UNIFORMITY—A must with today's high-speed automatic machine tools—it means less fixturing time, lower machine shop losses, and less balancing when required.

LESS MACHINING—Close control of dimensions means less machining, faster machining methods, or in some instances elimination of machining altogether.

MADE FOR LIGHT TRAVEL—Less machine stock means reduced weight—lowering transportation costs both in shipment and within the factory.

SUPERIOR SURFACE FINISH—Shell castings have "eye appeal"—their surface dresses up any finished product. Further, a smooth finish reduces wear on machine tools.





No machining is required on the surfaces indicated by arrows when this refrigeration crankshaft is shell molded.

Exhibit A in the case for shell molding is this refrigeration crankshaft. It may look like a relatively simple piece but machining it was a chore. For every one of the various surfaces a different machining operation had to be performed. Shell molding's smooth finish and close dimensional accuracy meant that a total of twelve (count 'em in the diagram at the left) surfaces could be used as cast. That's twelve time-consuming and costly machining operations eliminated.

Consider, too, the extra stock that had to be machined off when the shell molding process was not used. The original crankshaft before machining weighed 3.5 pounds while the shell molded crankshaft weighs but 2.5 pounds—a tremendous saving in transportation costs when you consider large quantities!

You be the judge. A number of different types of crankshafts are being shell molded in both gray and ductile iron at Lynchburg Foundry. Your verdict? Why not specify Lynchburg Foundry Shell Castings.

GRAY IRON AND DUCTILE IRON—
Heat treated or as cast

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One Crane for Every 6 Production Workers

Hand-propelled gantry cranes serve both sides of the Lathe Assembly Dept. 125 Cleveland Tramrail cranes, both standard overhead and gantry types, serve the Monarch plant.

EVERY manufacturer recognizes the need of mechanical handling equipment for hoisting and moving parts weighing hundreds of pounds, but not so many appreciate the value of cranes for handling parts that are within a man's ability to lift.

The Monarch Machine Tool Company, Sidney, Ohio, the world's largest exclusive manufacturer of lathes, made a thorough study of the effects of heavy manual lifting. They found that parts weighing only 50 or 75 pounds can be the cause of smashed fingers, hernias, and other injuries. When such parts must be handled numerous times a day, worker fatigue becomes a serious problem and affects not only production but workmanship.

Cleveland Tramrail cranes have proven to be the solution to the problem. For more than 15 years Monarch has been using Cleveland Tramrail equipment and today has 125 cranes of the standard overhead and gantry types which provide handling service throughout its fine modern plant. The importance attached to cranes here is attested by the fact that one crane is provided for every six production workers on the job at any one time.

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Overhead Materials Handling Equipment

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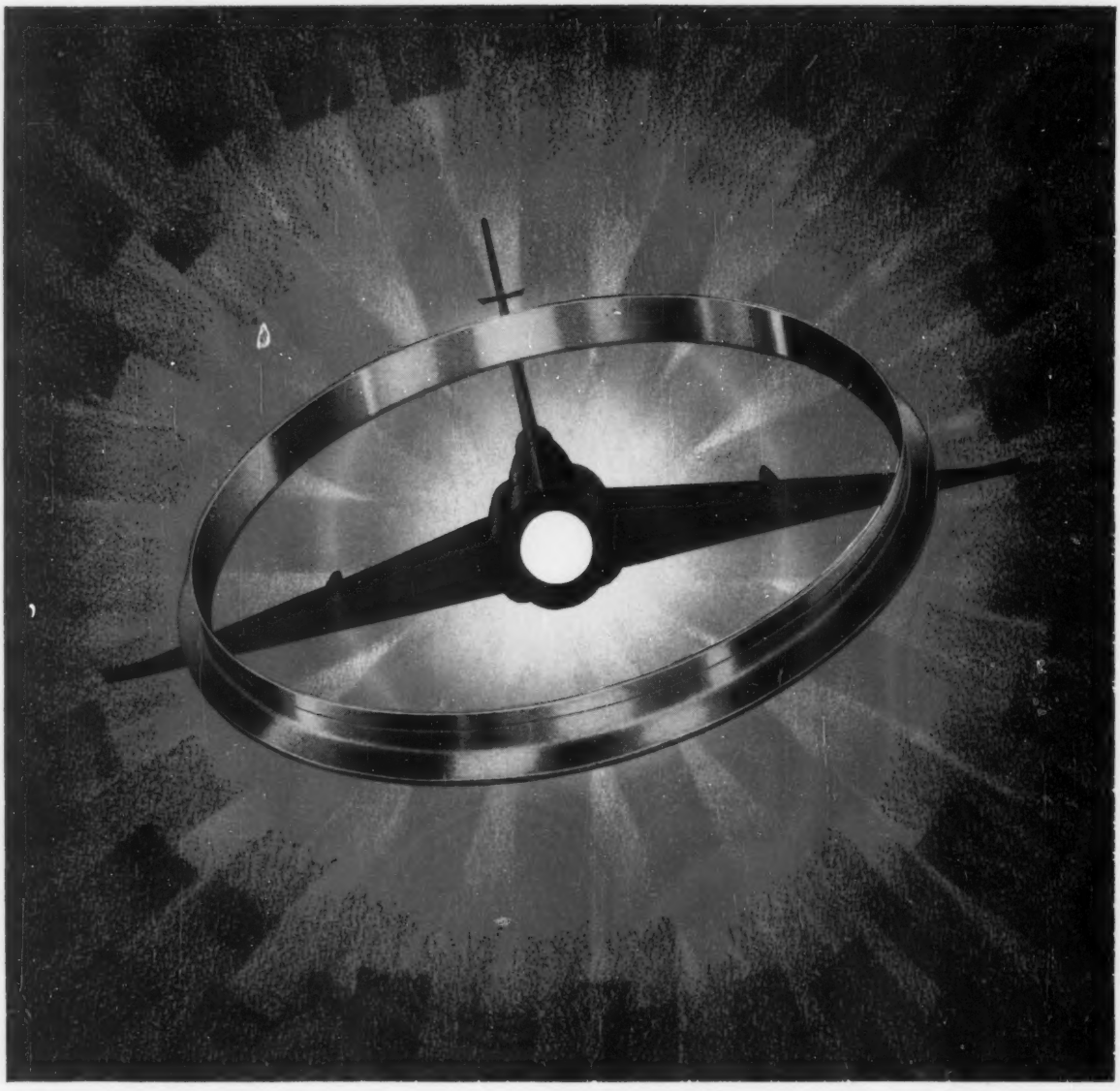

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American Welding is equipped to form, weld, fabricate and machine rings and weldments from 6" to 96" in diameter.

Why not contact American Welding's Industrial Products Division to talk about rings and components where top performance is required.

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AMERICAN WELDING

The World's Leading Manufacturer of Welded Rings

A Clue to White-Collar Sentiment

Watch the engineer-technician representation election May 8 at Minneapolis-Honeywell Regulator Co. It will give a clue to the impact of the Beck affair on organizing activities among white-collar personnel. Engineers and technicians will vote separately on three choices: United Auto Workers, Engineers & Scientists of America, no union. Some observers believe the UAW's chances with the engineers are slim, that they may even shuck their present affiliation with ESA and vote no union. Voting by the technicians could be about equally divided among the three choices.

Labor Hearings To Begin Again

Sen. John F. Kennedy's (Dem., Mass.) labor subcommittee will begin hearings later this month on the need for: 1. Public disclosure of welfare and health funds, whether operated by labor or management. 2. Minimum financial safeguards in union funds, including adequate reserves and independent audits. 3. Limitations on conflicts of interest of union leaders handling the funds. 4. Safeguards for the democratic control of the trusts. 5. Improved reporting provisions for the trusts under the Taft-Hartley Act. Prospects are favorable this session for congressional action on tighter laws to regulate the funds. (They now total some $26 billion.)

Mr. Keyserling Speaks

Leon Keyserling, top economic adviser under Franklin D. Roosevelt and Harry S. Truman, told an AFL-CIO conference: To increase gross national product to $500 billion by 1960, consumer income will have to increase $60 billion, with most of that to come from increased wages and farm income. He foresees wages climbing 20 per cent, farm income 70 per cent by 1960. He addressed representatives from 28 unions, discussing the future of Supplemental Unemployment Benefits. Said Albert Whitehouse, director of the AFL-CIO's Industrial Union Department: "We seek employment compensation and SUB equal to 65 per cent of the average basic wage and benefit periods greater than 26 weeks for all workers."

Steel Price Rise Coming

Watch for a steel price increase about July 1. U.S. Steel Corp. Chairman Roger Blough refuses to commit himself, but he does point out that labor contract provisions will boost labor costs more than 6 per cent (nearly 19 cents per hour per worker) by midyear. Purchased goods and services will eventually ride along on about the same basis of increase. However, he notes that the market is becoming more competitive and that there are "other considerations to take into account." The outlook: A $5 to $6 hike, a move that may precipitate a congressional inquiry.

Earnings Good

U.S. Steel's earnings hit $115.5 million in the first three months, a record for any quarter and $11.3 million above the same period last year. Bethle-

Technical Outlook—p. 83 *Market Outlook—p. 125*

hem Steel Corp.'s earnings for January, February and March reached $53.4 million, $8.5 million better than the mark for 1956's first quarter. Armco Steel Corp.'s net income dropped for the period. Earnings were $15.5 million, compared with $19.7 million in the same year-ago months.

The Break-Even Point at J&L

Jones & Laughlin Steel Corp.'s break-even point will be about 45 per cent of capacity when present expansion is completed, reveals Avery C. Adams, president. It will earn $6 million annually operating at 50 per cent of capacity, $40 million at 75 per cent and $67 million at 100 per cent. This year, operations are estimated at 95 per cent and net income is projected at $50 million.

Profit Ratios Slip

U.S. manufacturers recorded after-tax profits of 5.3 per cent of sales in 1956, compared with 5.4 per cent in 1955, reports Federal Trade Commission and Securities & Exchange Commission. Other after-tax percentages (1956 vs. 1955): All durable goods industries—5.2 vs. 5.7; primary iron and steel—7.0 vs. 7.2; primary nonferrous metals—9.3 vs. 8.3; fabricated metal products—4.0 vs. 3.8; machinery (except electrical)—5.4 vs. 5.1; electrical machinery—3.8 vs. 4.4; motor vehicles and equipment—5.2 vs. 6.9; other transportation equipment—3.4 vs. 3.7; instruments—5.8 vs. 6.0.

Low-Grade Alabama Ore Processed

Republic Steel Corp. and National Lead Co. have successfully completed production of iron ore briquets from low-grade ore at Republic's Spaulding Mine at Birmingham. The 5 to 25 lb briquets are a high grade product suitable for open hearth, electric or cupola furnaces. The development comes on the heels of the formation of R-N Corp. by the two companies to develop a process for direct reduction of iron ore (STEEL, Apr. 22, p. 47).

No Nickel for Stockpile

The Office of Defense Mobilization says the U.S. will make no calls for nickel to the stockpile the rest of the year. In 1956, diversions reached 76.6 million lb. Zinc and lead stockpiling will continue for a while. (See page 150.) Aluminum set-asides for the third quarter will be 145 million lb, 14 per cent of the total available and 5 million lb above the second quarter.

Straws in the Wind

As predicted in STEEL (Apr. 29, p. 125, and Mar. 18, p. 57), J&L reveals it's considering sites near Toledo for expansion . . . Rumors persist that when Treasury Secretary George Humphrey leaves Washington he will join National Steel Corp. as chairman, succeeding Ernest T. Weir . . . U.S. exports hit a monthly high in March—$2.1 billion . . . Welding industry sales will pass $1 billion before 1960, predicts J. H. Humberstone, president of Air Reduction Sales Co.

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WIDEST SELECTION of kinds, shapes and sizes of cold finished carbon steel bars. Available anywhere—even the hard-to-get intermediate sizes.

LARGEST STOCKS—Nobody comes even close to equalling the size of our inventories which enable us to supply tons of one type and size.

HIGHEST QUALITY ASSURED—Produced to exacting quality standards, Ryerson cold finished bars are unmistakably identified by a scientific color-marking system, double checked by spark test and guarded by special racks, padded slings and protective wrapping.

FAST, DEPENDABLE SERVICE—Better than five out of every six orders for steel from Ryerson stock are shipped within 24 hours, and when emergency demands it you can count on even quicker delivery. So call your nearby Ryerson plant for every cold finished bar requirement.

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Bars for general use: C1018, C1042

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Screw machine steel: Ledloy (the ultimate in free-machining steel), B1113, C1213, C1117 and leaded C1117

Machinery steel: Rycase (low carbon manganese steel), Leaded Rycase, Rytense (medium carbon manganese steel), Rytense Accuracy Stock, C1137, Ryco 44 and Stressproof (stress relieved medium carbon manganese steel)

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CUSTOMER SATISFACTION

started DSC and still keeps it growing

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By then existing standards, the mill's product quality and service were good. But Craine-Schrage had their own ideas about customer satisfaction and how best to achieve it. To them the only way was to build a strip mill of their own and run it their own way—really, the customers' way.

WHAT HAPPENED — It was a lot easier then than now! On March 9, 1923, Detroit Steel was incorporated. In December 1923 the first lot of strip rolled off the new mill.

WHAT FOLLOWED — Customer satisfaction paid off. By 1937 capacity had grown from 1,000 tons a month to 150,000 tons a year. Ten years later, DSC's Eastern strip business warranted an Eastern plant. That is how the mill at Hamden, Connecticut, came about. It started producing in 1949. Its capacity has grown too. It is now 75,000 tons annually.

THEN CAME INTEGRATION — By 1949 the vulnerability of a non-integrated, single product business was becoming apparent. In that year a fortunate opportunity made it possible for DSC to acquire on January 1, 1950, the Portsmouth Steel Works at New Boston, Ohio, with its basic steel and wire making facilities . . . and its immediate access to industry in the Ohio Valley.

Since then the plant has been rebuilt practically end to end with the addition of a second blast furnace (a 1,400 tonner), five 250 to 275 ton open hearths, a new bloomer, new hot rolled and cold rolled sheet mills and all that goes with them —nearly $90,000,000 worth, with more to come.

WHAT IT MEANS TO STEEL USERS—If any one reason may account for this growth—it is that over a period of 34 years, under changing business conditions, DSC products, policies and practices have given satisfaction and profit to an increasing number of customers.

How about talking to a DSC customer "Rep" about your profitable use of DSC products and services.

Call him . . . today?

Customer Satisfaction Is Our Business

DSC MILLS AND PRODUCTS

PORTSMOUTH DIVISION, PORTSMOUTH, O.

Coke • Coal Chemicals • Pig Iron
Basic OH Steel Ingots • Blooms • Slabs • Billets • Rods
Hot Rolled and Cold Rolled Sheets • Low and Medium Carbon
Manufacturers' Wire • High Carbon Specialty Wire • Aluminum Cable Strand
Reinforcement • Rope Wire • Tire Bead Wire • Welded Wire Fabric

MILL DIVISION: DETROIT, MICH., HAMDEN, CONN.

Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel

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DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

CUSTOMER "REP" OFFICES:

Charlotte, N. C., Chicago, Cincinnati, Cleveland, Columbus, Ohio., Dayton, Ohio., Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., Milwaukee, Wis., New York, St. Louis, Toledo, Worcester, Mass.

You Need Market Research

Are you using market research to full advantage?

Companies that did little or no market or commercial research up to a few years ago are leaning heavily on it for much of their planning.

Here are some of the ways they are using it:

- To determine market objectives.
- To find what products and services customers want.
- To locate sales offices and outline sales territories.
- To locate new plants or expand old ones.
- To get information on materials and processes that will help lower costs.
- To plan production.

Much of the information needed in guiding your business is readily available from the business press, trade associations, chambers of commerce and the government. Some of it is obtainable only through original market research—by going to your customers and prospects.

Your efforts will be rewarded with information like this:

- The crop of babies born in the 1940s and the rate of family formations in the 1960s can be translated into future demands for new houses, new cars, new appliances and countless other products.
- The rate of growth in the consumption of metalworking products could mean that the industry will triple in size in 20 years.
- Michigan, Ohio, New York, Pennsylvania and Illinois account for half the metalworking activity in the U.S. Fast-stepping California has moved up closely in sixth place.
- The product you think is acceptable to your customers is losing out to a better product made by a competitor.

Facts like those are helping many a company determine who their customers are, what products they want, where to make them and how to sell them.

Not too many years ago it was pretty common practice to launch a new business or new product by taking a long shot based on ivory tower thinking and a lot of guesses. Some of the ventures were successful. Many were not.

The point is this: Today, the odds against the hunch system are even greater than they were. More and more companies, including your competitors, are taking full advantage of the scientific approach offered by market research.

Are you?

Irwin H. Such

EDITOR-IN-CHIEF

ENTHONE *Leads* in SPECIALTY FINISHING PRODUCTS

METAL STRIPPERS

"ALUMON" for Plating on Aluminum

RUST REMOVERS

RUST PROOFING COMPOUNDS

ENAMEL STRIPPERS

METAL BLACKENING COMPOUNDS

Metal Cleaning and Degreasing Compounds

Conversion Coatings for Zinc and Cadmium

STOCK POINTS:
Seattle, San Francisco, Los Angeles, Chicago, Detroit, Dayton, Cleveland, Binghamton, New Haven

WORLD-WIDE DISTRIBUTION
. . . ALSO IN
Canada, Brazil, England, France, Sweden and Germany

Since 1930, ENTHONE Incorporated has developed and brought to the metal finishing market many specialty products and processes. Often these products have provided the answers to finishing problems previously unsolved. ENTHONE ENSTRIPS, for example, are patented products for the selective dissolving of one metal plated on another without attacking the base metal.

ENSTRIP A — U.S. Patent No. 2,649,361 — was the first product ever offered for dissolving nickel plate without attack on the steel basis metal.

ENSTRIP 165-S — U.S. Patent No. 2,698,781 — was the first product ever offered for dissolving nickel from copper base alloys without attack on the basis metal. And there are many other selective strippers in the ENSTRIPS group to meet all requirements.

If you have a metal finishing problem, ask ENTHONE *first!* Write now for the folder "They are HERE . . ." describing **20** ENTHONE answers to difficult finishing problems.

ENTHONE INCORPORATED

442 ELM STREET, NEW HAVEN 11, CONNECTICUT

Metal Finishing Processes • Electroplating Chemicals

Metalworking: Dominant Growth Industry

These products outpace gain in national production average
Annual average increase*

40% AND OVER
Titanium sponge
Power brake installations
Power steering
Television sets
Dryers, electric & gas

30 TO 40%
Air conditioners, room
Shavers, electric
Tape recorders for home use
Pick-up hay balers

20 TO 30%
Diesel-electric locomotives
Automatic transmissions
Disposers, food waste
Lawn mowers, power
Freezers, farm & home

15 TO 20%
AC transformer arc welders
Magnesium
Diesel & semidiesel engines
Trailer coaches, mobile home type

10 TO 15%
Garden tractors
Mixers, food
Phonographs, single
Kitchen cabinets, steel
Space heaters, floor & wall
Dishwashers, electric & gas
Clocks, electric
Aluminum, primary ingots
Fractional horsepower motors

7.5 TO 10%
Ranges, electric
Outboard engines
Power sprayers & dusters
Cans, metal (steel consumed)
Oil burners, residential
Pipelines, oil
AC single phase motors
Fans, electric
Truck trailers

*Based upon change in output from 1929 (or year in which data first became available) to 1955.

Italic type denotes new products introduced commercially in "reasonably large volume" for the first time in the last 25 years.

Source: Survey of Current Business, Office of Business Economics.

New Products Spur Output

Office of Business Economics' study shows that metalworking accounts for 38 per cent of fastest growing products. New items have largest rate of increase in output

"IN 1956 about one-sixth of our sales and one-third of our net profits came from products which we did not make five years ago," states E. J. Hanley, president of Allegheny Ludlum Steel Corp., Pittsburgh.

The impact of new products on our economy is illustrated even more dramatically in a study of production growth rates made by the Office of Business Economics of the Commerce department. Among the 98 items showing the fastest annual rate of growth (7.5 per cent or more), 43 were produced for the first time in significant quantities within the last 25 years. This has been one of the most important factors contributing to the national average production growth of 3 per cent, concludes OBE.

Hold Tight — Businessmen who are anxious to hitch their production wagons to a rising star will find much of value in this study. Metalworking men especially should take note because metal products represent the largest group — over one-third — in the "fastest growing" category. (See table, left.) Of almost equal importance is the fact that metalworking also accounts for 32 per cent of those industries showing a declining trend. (See table, page 52.)

The OBE studied 270 products and 18 services, analyzing statistics from 1929 (or the first year for which significant data are available) through 1956. All the 20 major industry groups under the Standard Industrial Classification are represented. The combined weight of the products, in terms of value added, accounts for roughly three-fifths of the Federal Reserve Board's industrial production index.

Slowing Down—One reason for the predominance of new products in the fastest growing group is the lower base from which they start. Titanium sponge production, for instance, was only 25 tons in 1949. In 1951, it had increased 19 times to 495 tons. It is obvious that few products can maintain that kind of growth. Production of television sets has a long term growth of 80 per cent a year. But between 1951 and 1955, the industry averaged only 10 per cent a year. More recently, it has been in a downtrend.

Of 16 selected items from the fastest growing group, only two have not suffered from maturity percentagewise. Air conditioning and outboard engines had a higher rate of growth in the 1951-1955 period than for the long term.

In the Middle—In the moderately growing group (average annual rate of increase of less than 7.5 per cent), metalworking again

Some Metalworking Products Decline

Average annual decline*

UP TO 2%

Lead, refined, new supply
Wire nails & staples
Sewing machines, industrial
Heating stoves, domestic
Merchant shipbuilding
Ironers, electric

2%

Lawn mowers, hand
Rails & accessories

3 TO 5%

Railroad freight cars
Pumps, hand and windmill
Railroad passenger cars

5% AND OVER

Radiators and convectors
Locomotives, electric
Steam engines, reciprocating
Locomotives, steam

*Based upon change in output from 1929 (or year in which data first became available) to 1955.

dominated with 33.5 per cent of all products. This group of 143 products is noteworthy because it includes no new products. It represents the bulk of all manufacturing effort in the U.S. with about half of the items showing a greater rate than the national average. But some of the more important products, such as steel, automobiles and a few of the nonferrous metals, fall below 3 per cent a year.

About 50 per cent of the products in this moderately growing group are currently expanding at above their average long term rates. The electric power industry, which shows a 1929-1955 growth about twice that of the national average, has been expanding at three times that rate since 1940. From 1951 on, the rate has been even higher because of the greater power demands of the fast-growing aluminum and atomic energy industries.

Buggy Whips—Not all products have been growing. Of the 288 products and services in the study, 47 show declining tendencies. Metalworking accounts for 15 of them. With few exceptions — notably steam locomotives—most of the products in this group are still being produced in large volume when you look at 1929 figures.

Technological change has been one of the chief factors in these declines. Competition has been another. Expansion of railroad transportation has been below the national average because of increasing competition from trucks, waterway transportation and airlines. This has caused a decline of 2 per cent in the output of rails and accessories and a drop of 3 to 5 per cent in railroad freight and passenger cars over the long term. Recent trends in freight car building have been up but probably not enough to alter the long term trend.

Loopholes — There are some areas in which the study is weak, OBE admits. The electronics industry, for example, is too new. In others, such as the machinery and instrument industries, adequate data are not available for analysis. But on the basis of the Federal Reserve Board's index of machinery output, it appears that the rate has been about 4.5 per cent a year since 1929 and roughly 9 per cent a year since 1939.

The Research & Development Board of the Department of Defense estimates that industry and government together spent about $6 billion on research in 1956 alone. If this effort continues, new products will continue to dominate the growth pattern of American industry and keep the annual average increase on the uptrend.

A Boost for H-Iron

"For new steel capacity, the steelmaker cannot afford to overlook the combination of an H-iron plant with electric furnaces." So said A. M. Squires and C. A. Johnson of Hydrocarbon Research Inc., New York, in a paper presented before an industry meeting in Pittsburgh.

They added: "The attractiveness of an H-iron installation in Texas, or other natural gas producing regions, is apparent from cost figures."

During the last year Hydrocarbon Research has planned a number of commercial-size H-iron installations, the men revealed. H-iron, produced through a gaseous reduction of iron ore, is a metallic charge for steelmaking furnaces.

Fuller Opens Western Plant

Fuller Co., a subsidiary of General American Transportation Corp., Catasauqua, Pa., has opened a $1.5-million plant at Compton, Calif.

About 160 people are employed in the 65,000 sq-ft facility which makes blowers, vacuum pumps and compressors.

Moore Tool Adds Space

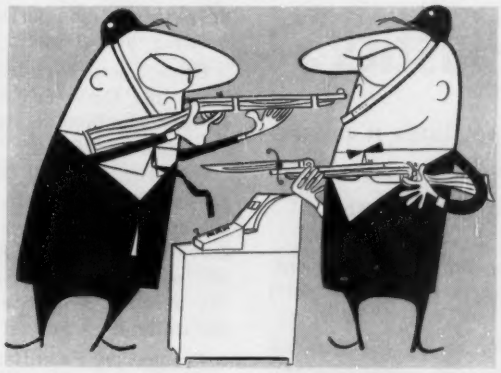
Moore Special Tool Co. Inc., Bridgeport, Conn., will more than double its plant area when it moves into a 74,600 sq-ft building next to its present plant late this year.

Richard F. Moore, president, says the company will be able to increase its machine tool production more than 50 per cent.

Westinghouse Net Up Sharply

First quarter sales of Westinghouse Electric Corp. were $475,686,000, and net income was $14,198,000. New orders booked were the largest in any first quarter. The company's backlog of orders for apparatus, industrial and atomic products is at a record level, says Gwilym A. Price, president.

In the first quarter of 1956, when the company's major plants were strikebound, sales totaled $255,366,000. The loss for that quarter was $18,575,000.



"War Games" for Industry

AMA uses "problem" technique to stimulate executive thinking. Three-man teams compete with each other; run hypothetical business for "ten years"

LIKE to try your hand at running a company for "ten years"?

You can with a new business game which has been introduced by American Management Association, New York. Its missions: 1. To help top and middle executives better see the over-all picture of running a company. 2. To keep an edge on their thinking.

Several test games have been run off in the last few months. AMA officials are so pleased with results they plan to incorporate the technique into the curriculum of the Academy of Advanced Management at Saranac Lake, N. Y., this summer. Says AMA's Donald Keen: "This marks the first business 'war game' ever developed. It could well be one of industry's major training tools of the future."

As soon as game format is set, AMA will promote registration for the summer course. Starting in the fall, games will be played at its New York office.

Approach—Business sense rules. Three-man teams (usually five of them) compete. Team members (the committee approach is the most popular) have 25 minutes to make the initial decisions for the first quarter. As "years pass," the decision time per quarter is slashed in gradual increments to about 8 minutes.

Participants pass judgment on expenditures for production, marketing, research and development and additional plant capacity.

Electronics — The general program is set up on an IBM 650 computer. After teams decide on how they will spend funds, choices are circled on operating work sheets, and the reports are put through the programmed 650, which determines the interactions of the decisions made by each team. A 407 printer produces operating, performance, annual and marketing reports. Before team members complete the next quarter, the previous quarter's results are available.

Teams start on an equal footing in respect to such things as productive capacity and resources. They use these general theories: 1. Research and development expenditures increase the attractiveness of the product, tend to reduce unit price. 2. Marketing expenditures increase sales. 3. Unit sales vary proportionately with the product price. 4. Larger productive capacity should reduce per unit cost.

Example — STEEL attended a game. Each team was informed that the potential market was 4,545,000 units. Productive capacity per team was 1,010,000 units, with an opening inventory of 150,000 units. Funds available for each: $4,425,000.

First quarter choices:

- Selling the product for $4.45 to $4.65. (Teams decided it was a consumer type with only a small margin of profit per unit sold.) Depending on choice, production costs were in the $3,348,000 to $4,325,400 range.
- Marketing investment: $170,000 to $230,000.
- Research and development expenditure: $85,000 to $115,000.
- Plant expansion: $40,000 to $60,000.

There were other ways to spend the $4.4 million, too. Industry probes, costing from $5000 to $45,000, revealed such items as competitors' share of the market, total industry expenditures for research and development, marketing and other financial data.

Value — None of the decisions made (or concepts developed) "while gaming" can be used "as is" when executives return to their home offices. But, more importantly, they have the knowledge of how investments interact in four areas where companies must spend the lion's share of their dollars.

One corporate official who recently participated said: "You work with two men you have never met before who have different backgrounds and disciplines. It's amazing how we learned—not only from the game but also from one another." Explained another participant: "It parallels war games played by top brass. Following war game strategy literally could never win a war, but it does create situations which are similar to what might happen during a war."

Yale Builds in South

A $4-million plant is being built in Forrest City, Ark., by Yale & Towne Mfg. Co., Philadelphia.

The 157,000 sq ft building will be completed this summer. It will employ about 350 workers when it reaches full production.

The new plant will enable the company to expand its production of hand trucks and hand hoists now made in its material handling equipment plant in Philadelphia. The move will free the Philadelphia plant for expanded production of industrial lift trucks and electric hoists.

Heil Co. Shifts to Plastics

A maker of heavy transportation equipment finds it advantageous to use reinforced plastics in part of its production. But it made a careful survey before taking the plunge

TREAT developments in plastics as you would any other new material or technology—if it's to your advantage, get into it.

That's the advice of Arnold F. Meyer, vice president of the tank division of Heil Co., Milwaukee. Not too long ago, few people would have associated plastics with heavy transportation equipment. Today, a good percentage of Heil's insulated tank truck production involves reinforced plastics.

Self-Defense — Heil made the move three years ago to protect its specialty market—it sells over 50 per cent of the insulated tank trucks used by the dairy industry. The firm didn't just plunge into the field—steel still costs less than plastics.

Heil's research answered these questions: 1. Is the market for insulated trucks sufficient to warrant a new type production venture? 2. What advantages would a plastic insulated tank have over the conventional steel type? 3. Would the price be competitive?

The Field — The refrigerated transportation field is steadily growing. The latest influence is frozen food. Its consumption has tripled since 1946. Frozen meat is a small factor, but it is catching on rapidly.

The nation's fleet of refrigerated transportation equipment breaks down this way: Conventional trucks, over 125,000; truck trailers, 40,000; railroad cars, 125,000 units.

Insulated truck replacement alone—the field Heil is in—represents an annual market of over $75 million. Although Heil has no definite plans to enter the refrigerated freight car field, officials admit they are investigating the possibilities.

Research — Another question Heil had to answer: Is there a demand or need for a new construction material? Kenneth Sanders, who conducted the market study among thousands of operators of refrigerated trucks, found these problems were universal:

1. Insulation in conventional trucks was often unsatisfactory. Moisture condensation often reduced the efficiency of the insulation and added dead weight.

2. Rust and corrosion problems meant maintenance costs.

Advantages — Tests indicated that reinforced plastics, sandwich type construction with 2-in. insulation has equal or better insulating properties than conventional steel construction with 3 to 4 in. of insulation. Plastics form a complete vapor seal, eliminating moisture from insulation. Plastics inherently are not susceptible to corrosion. One-piece molded construction also provides a stronger truck body.

Costs—Heil found that though plastics cost 30 per cent more than steel, labor costs are about 20 per cent less. "This puts a 10 per cent higher price tag on the finished truck," officials point out, "but we've found operators willing to pay the premium for 15 per cent less weight, which permits a greater payload, plus the superior insulating properties."

Other Factors—Answers to questions like these are as important as the ones involving markets, advantages and costs:

Can the material be used with present production facilities? Can the engineering and technical staff move into the new technology, or will a new team be needed? Does the activity require skilled workers difficult to recruit?

Production Facilities — Working with Insulation Associates Inc., an engineering firm, Heil found that its facilities were suitable, even though production methods for utilizing the two materials differ completely.

Producing a one-piece molded tank with reinforced plastics requires a giant steel mold. Mold production meshed perfectly with Heil's plate fabricating facilities and know-how. The only facilities Heil had to add were for woodworking to handle the balsa wood which forms the core of the plastic sandwich.

Production begins with the fabrication of a 16-gage stainless steel liner tank—it's practically identical to the conventional one. To the liner is added the inside plastic reinforcing material—woven glass cloth. Formed around this is the balsa wood insulation.

The liner unit is placed into the huge mold—about 35 ft long—which contains the reinforcing material for the outside of the

Heil Co.'s newest line: The insulated van

plastic sandwich. The top of the mold is put on, and the plastic resins are introduced. They bond the liner and sandwich into a one-piece insulated tank with a capacity of up to 5300 gallons.

Engineering — "Designwise," says George B. Luhman, engineer in charge of plastic products, "reinforced plastics are an engineer's dream. You can design the laminate to put the exact strength you require into the exact spot you want it."

Nor did labor prove a problem. A lot of handwork is required, but, fortunately, it's not too difficult for the average worker to master in a minimum of time.

Outlook—Vice President Meyer believes that it won't be long before more than 50 per cent of the insulated tank trucks it makes will be the plastic type. The company's confidence is shown in its entry into a new field—insulated van trucks used for delivery of perishables, such as meat, milk, ice cream and frozen food.

Sets New Metal Allotments

Third quarter allotments of steel, copper, aluminum and nickel alloys for "A" products have been announced by the Office of Defense Mobilization.

Steel allotments are 5 per cent higher (589,235 net tons, compared with 561,619 net tons in the second quarter); copper, 4 per cent higher (46,949,000 lb, vs. 45,101,000); aluminum, 3 per cent higher (126,805,000 lb, vs. 123,090,000 lb); nickel alloy, 4 per cent lower (9,532,000 lb, vs. 9,873,000 lb).

Allotments for "A" products represent purchase authority to prime contractors and producers of specially designed military equipment for the four metals at mills.

Plant To Extract Beryllium

Lummus Co., New York, redesigned a railroad roundhouse into an extraction plant for the Beryllium Corp., Reading, Pa.

The $4 million project will be completed in August.

Atomic Energy Commission will buy all of the plant's output of beryllium ingots during the first five years of production—a planned 500,000 lb.

Panel members W. P. Carlin of Republic Steel Corp. (left) and H. R. Breslau of Southern Galvanizing Co. discuss zinc's future

Needed: Lead, Zinc Research

LEAD AND ZINC producers are looking for new ways to hang onto current markets and to expand new ones.

Reasons: Primary lead consumption in the U.S. increased an average of only 1.67 per cent from 1947 through 1956. Slab zinc's average was 3.2 per cent. Industrial consumption of lead in 1956 (excluding stockpile purchases) was 1,190,000 tons. The figure for zinc was 977,697 tons.

Barometer — During the first quarter, lead shipments were off about 10,000 tons per month. Zinc shipments were down 15,000 to 20,000 tons from those of the first three months of last year.

What's wrong?

A user panel at the joint meeting of the Lead Industries Association and the American Zinc Institute urged: "More research."

Here is a sample of what was talked about:

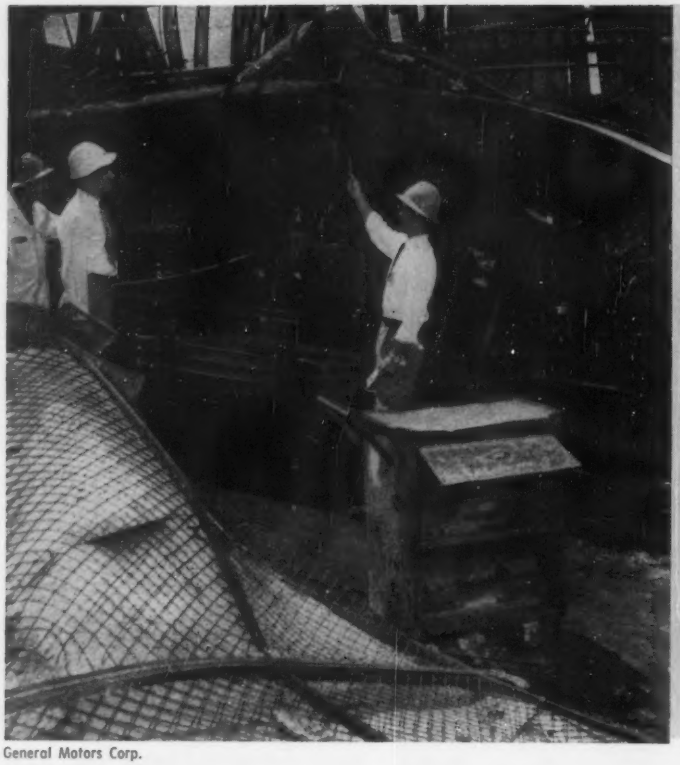
Automotive—Plated zinc diecastings will not take the corrosive action of salt on streets in the winter. Buffing and finishing costs of coated zinc diecastings are too high. Areas for research: 1. Development of a quality plating technique. 2. Development of a way to reduce the tendency of zinc diecastings to creep at room temperature. 3. Development of colored diecastings.

Appliances—Zinc must meet the challenge of aluminum and plastics. Owing to design and flexibility, plastics are gaining as structural materials. Problems: 1. Buffing and plating costs are out of line. 2. Zinc diecastings are adversely affected by detergents when used in washing machines.

Galvanized—There are 34 continuous galvanizing lines in operation. Five are being built or planned. Galvanized sheet shipments should increase 3 to 5 per cent annually, predicted one panelist. Recommendation: Research on new types and uses for zinc protective coatings. Sample: A major steel producer is experimenting with a light zinc coating on steel prior to painting or enameling.

Other areas for research: 1. How zinc coatings can be made heavier without increasing brittleness. 2. Development of zinc alloys for high temperatures. 3. Cheaper dies. 4. Basic research on welding galvanized sheets and plates.

Bright Side—Lead producers are developing a machine to continuously extrude lead alloy sheathing. Plans are under way to promote lead's growing use in atomic energy. The American Zinc Institute is farming out research to improve finishes, develop economical plating techniques and to color diecastings.



General Motors Corp.

How To Carry an Umbrella

You'll come through an emergency a lot better if you establish:

1. List of personnel replacements for vital posts.
2. Technical teams for damage assessment.
3. Alternate headquarter facilities.
4. Emergency financing for employees and your own corporate needs.
5. A special emergency committee of top executives.

You also need to consider:

1. The possibility of plant dispersal.
2. Record protection.
3. Protective construction.

Ready for Disaster?

More companies are making plans for emergencies. Here, 38 top executives tell you how to get started. Personnel replacements, record protection are basic

HAS a flood ever cut off your plant from its suppliers? Are you in an earthquake area? Has your source of power ever been shut off? Have you ever had a major fire?

What would you do if your plant, a customer's or a supplier's, were partially destroyed by enemy attack?

Full Report — In February, 38 top executives met in Washington to exchange ideas on how to continue production in the event of an enemy attack. Their conclusions are relevant to any disaster (accidental or manmade) which might strike your plant.

The full report is available from Commerce department field offices. It represents the results of the Industrial Defense Program initiated three years ago by the Business & Defense Services Administration.

Problems—Here are the areas you should consider if your plant (or company) is to be ready for any emergency: 1. Who's responsible for your planning? 2. Is your plan in writing? 3. How are you storing vital records? 4. Who takes over if key management personnel are not available? 5. Do you have an alternate company headquarters? 6. Can you quickly assess any damage? 7. Are emergency finances available? 8. How are your facilities protected? 9. Are they dispersed? 10. Are they underground?

Progress—H. B. McCoy, BDSA administrator, believes much progress has been made. Large corporations in particular have been doing a good job. BDSA would like some of their thinking to filter down to smaller manufacturers.

Conference participants included: Aluminum Co. of America, American Machine & Foundry Co., Boeing Airplane Co., Chrysler Corp., Cincinnati Milling Machine Co., Ford Motor Co., General Electric Co., Jones & Laughlin Steel Corp., Koppers Co. Inc., Mueller Brass Co., Raytheon Mfg. Co., Reynolds Metals Co., Sperry Rand Corp., Stromberg - Carlson Co., Thompson Products Inc., Timken Roller Bearing Co., U.S. Steel Corp., Western Electric Co. and Westinghouse Electric Corp.

Responsibility — Most of those firms have committees to co-ordinate emergency planning. In a typical setup, the production vice president is chairman. Department representatives report on their planning to an industrial defense co-ordinator. Multiplant corporations have members from each plant on such a committee.

Implementation—The plan must

be in writing to provide a basis for periodic checks on progress. Warning: Avoid the tendency to sit back and relax once the plan is on paper. You may fail to implement it properly.

With the plan comes the safe storage of company records. U.S. Steel Corp.'s Mine X is one answer. Other firms are using commercial bombproof shelters in nontarget areas.

Replacements—"When the captain is killed, the lieutenant steps in; when the lieutenant is killed, the sergeant . . ." Sixteen of the companies represented at the conference have set up replacement schedules for management personnel; some lines of succession extend through lower echelons to supervisory personnel.

Several of the firms are tying their management development programs to schemes for succession in an emergency. The lists are confidential and subject to review at least once a year. One firm has placed copies of its list in four widely scattered sections of the country; all top executives have been advised where they are, although only the chairman, the president and one vice president know its content.

Ten companies have established alternate headquarters. Some are locating them near record storage centers. One firm picked its president's home because it's in a nontarget area.

Damage? — You can set up a center into which damage assessment can be done with electronic computer data. You might want to locate a company plane in a safe area to be used only in an emergency for aerial reconnaissance. People living near your plant might be asked to report to you on damage if your headquarters is in another city.

You may need to set up technical teams to survey damage on a moment's notice.

You and your employees need money, too. One firm has 16 reporting centers for employees. They are supplied with $25 and $100 checks. For its corporate needs, securities are ready in secret nontarget vaults.

Protection — The rehearsal of shutdown procedures is fundamental to plant protection. Some firms have built shelter stations for personnel near the plant.

Most of the firms at the conference are using dispersion of new plant facilities as a tool. The economics of plant dispersion is a subject in itself, say these experts, but the chance of locating in a target area is considered when expansion plans are made.

Short Cut To Move Iron Ore

A dock to handle iron ore and jasper pellets for shipment from Michigan's upper peninsula is being built at Gladstone, Mich., (near Escanaba) on the northern shore of Lake Michigan.

Most upper peninsula ore goes to Chicago area furnaces. It's shipped now from Marquette, Mich., on the southern shore of Lake Superior. This means it has to go part way through Lake Superior, then through the Soo locks and into Lake Michigan.

The Lake Superior & Ishpeming Railroad (Cleveland-Cliffs Iron Co. owns 75.2 per cent of its capital stock) has combined with the Soo Line Railroad to build additional trackage to move ore trains from Michigan's upper peninsula ore fields to the Gladstone dock. The belt conveyorized dock is expected to be ready for the opening of the 1959 ore shipping season.

Cleveland-Cliffs is concentrating on improving the iron content of its regular ores and the expansion of capacity to produce jasper pellets. It is constructing a plant in Michigan to increase the iron content of regular ores by a combination of moisture reduction, crushing, screening and lowering the silica content. The plant is expected to be completed in the first half of this year. The company also is installing a belt conveyor in the Mather "A" mine. By using a 3700-ft inclined conveyor, the company expects the lower operating levels of the mine to come into production in a shorter time at minimum cost.

Carpenter Expands Finishing

Carpenter Steel Co., Reading, Pa., has started a $250,000 addition to its cold finishing department. Completion is scheduled for October.

UK for Euromarket

London economist says Britain cannot afford to be left out; will push free trade

CREDITING the U.S. with inspiring and making Euromarket possible, Geoffrey S. Browne, director, the *London Economist* intelligence unit, told the Cleveland World Trade Conference that Britain is definitely in support of the six-nation common market.

"This movement is not just idealism," he said. "It is the result of a definite urge to get together. It is backed by the common people who want peace and a higher standard of living."

Necessary — Owing to commitments with the commonwealth nations and the sterling area, Britain cannot join Euromarket, Mr. Browne said, "but she cannot afford to be outside."

He added that Britain's suggestion that Euromarket be included in the free trade area of Britain and the commonwealths was a sincere effort to broaden the area of a tariff-free market for the general betterment of some 200 million people.

Some Autonomy — Members of the British free trade group have no tariffs between themselves, but each member country sets up its own for the rest of the world. Members of Euromarket will have no tariffs between themselves and will also have a joint tariff on goods from outside the common market area.

France, Germany, Italy, Belgium, Netherlands and Luxembourg make up Euromarket (STEEL, Apr. 8, p. 69). If Britain's free trade idea is accepted by them, Mr. Browne said, Norway, Sweden, Denmark and possibly Austria would likely enter the free trade agreement.

Around the World—"This development would mean a market of more than 200 million people all around the world to whom goods from the member nations would move tariff and duty free," he said.

Mr. Browne predicted that Euromarket would be approved by the national assemblies involved before the end of 1957.

Mobilization Policy: Hands Off Business

DISCUSSING a new review of expansion still existing under the fast tax write-off program, Gordon Gray, defense mobilizer, reports the physical requirements for defense are changing.

Mr. Gray hints at an important distinction between defense in quantity and defense in quality. Reading between the lines, check these developments in the Office of Defense Mobilization's program since the steel industry was refused fast write-offs for its expansion program last December: 1. Revision of Defense Mobilization Order VII-7 to refer specifically to a thermonuclear attack against us. 2. Restriction of fast write-offs under the catchall expansion goal No. 224 to facilities directly affecting Defense department and Atomic Energy Commission procurement. 3. Mr. Gray's announcement that these goals are being reviewed: Nickel, steam turbines, steel castings, strategic mica substitutes and rollon-rolloff ships.

Missile Program—Those moves add up to a hands-off policy toward industry, when considered in the light of Defense's reported breakthrough in missile development and the decision to slow down our production of B-52 intercontinental bombers.

We may be getting ready to put all our mobilization eggs in the missile basket. Missiles probably represent Mr. Gray's defense in quality.

The Facts—Mr. Gray did not imply that any of the five expansion goals will be closed soon, but they probably aren't being reviewed for nothing. He did say that three others have just been closed to drop the open total to nine. These got the ax: Steam boilers, mercury and oil and gas pipelines for specific defense programs. One of the remaining nine is closed for all practical purposes: Tankers. Only one more tanker is needed to bring the total sponsored under the goal to the maximum of 100. Only three goals seem safe for a while: Liquid oxygen and liquid nitrogen; production facilities for defense and AEC under goal No. 224; and research and development laboratories.

DMO VII-7—The matter appears to be wrapped up except for the shouting, if you read the revised defense mobilization order. Its references to urgent military needs, rather than just military needs, and its call for urgent production facilities to keep going in spite of damage from an atomic weapon, make it clear that we are thinking in terms of quick retaliation against an enemy attack, rather than a long mobilization build-up after an attack.

Conclusion: U.S. industry will need only a minimum of supervision and advice from the government to carry out this new program, believe some Washington dopesters. Certain firms will become, however, even more practical arms of the Defense department. So the aviation industry may be viewed as a defense unit because 85 per cent of its sales went to the military last year. Army Secretary Wilber M. Brucker notes that 50 per cent of the industry's production will switch to missiles in the next ten years.

In effect, our missiles will close the gap between a peacetime economy and a wartime economy from a mobilization standpoint.

The Brass Will Have To Wait

Look for Sen. George A. Smathers (Dem., Fla.) to introduce a bill requiring high ranking armed servicemen to wait at least three years after retiring before accepting positions with private industry. This cooling off period will forestall some of the influence retired generals and admirals may have on their former associates, believes the senator, who is chairman of the government procurement subcommittee.

Budget Cutters Take Note

The hoped for budget surplus of $1.8 billion in fiscal 1957 may not come about after all. Defense spending for the year will run $1.4 billion more than expected last January, says the Pentagon. Outlook: Congress will try even harder to cut Defense's $38 billion budget for fiscal 1958. Legislators ask why Defense so misjudged its expected spending.

Now or Never for Bulletin F

Joel Barlow, taxation committee chairman, U.S. Chamber of Commerce, thinks this is the year of decision in industry's fight for better depreciation allowance. "If we don't convince the Treasury department this year, we'll stay in the depreciation strait jacket for a long time to come." Recommendations for changes in Bulletin F must be submitted to Internal Revenue Service before June 30.

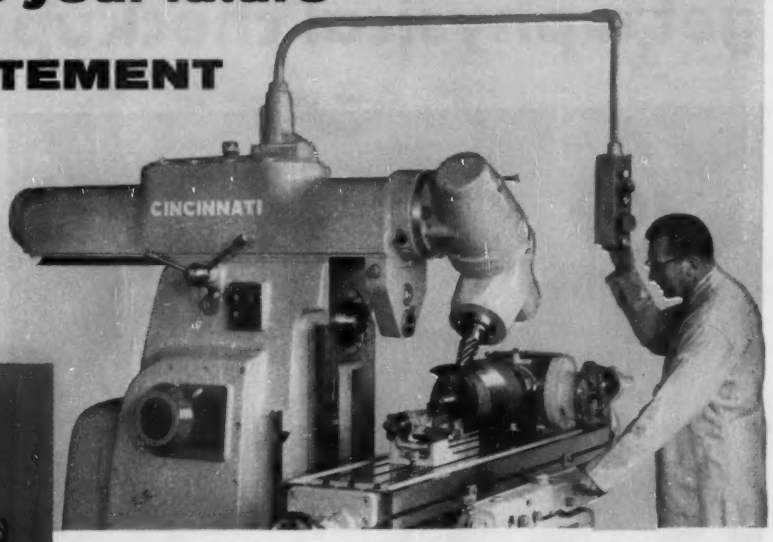
Let's De-Ice Great Lakes

Sen. Alexander Wiley (Rep., Wis.) is serious about this one. He's talking with federal officials about Sweden's program for de-icing the waterways around Stockholm. Tubing is planted on the bottom of the channel. Compressed air bubbles sent through it to the surface keep ice from forming. The system can clear 2 ft of ice from a 50-ft deep channel in two weeks.

DIAL TYPES

will improve your future

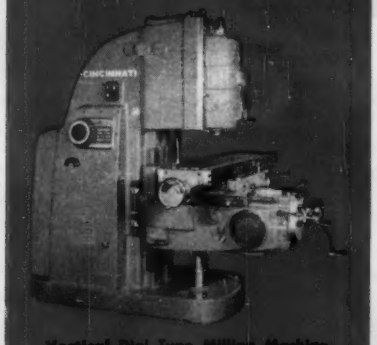
PROFIT STATEMENT



Universal Dial Type Milling Machine, equipped with Independent Overhead Spindle Attachment

CINCINNATI

Plain Dial Type Milling Machine



Vertical Dial Type Milling Machine

DIAL TYPE LINE		table traverse	main drive	automatic table cycles available
No. 2	Plain	28"	10 hp	yes
	Universal			no
	Vertical			yes
No. 3	Plain	34"	15 hp	yes
	Universal			no
	Vertical			yes
No. 4	Plain	42"	20 hp	yes
	Universal			no
	Vertical			yes

The profit you make or would like to make today and several years hence may well depend upon the machine tools in your shop. Are they contributing their full share to the profit statement? Compare your milling operations, for example, with the results obtainable when assigned to the latest CINCINNATI® Dial Type Milling Machines. These machines have the potential to produce faster, more accurately and at lower cost than any other equipment in their classification. A few reasons why include:

Push-button front and rear selection of spindle speeds . . . power front and rear selection of feeds, 3/8" to 90" per min. . . . automatic backlash eliminator . . . Dynapoise chatter-damping overarm . . . automatic table feed cycles, if desired, for plain and vertical machines.

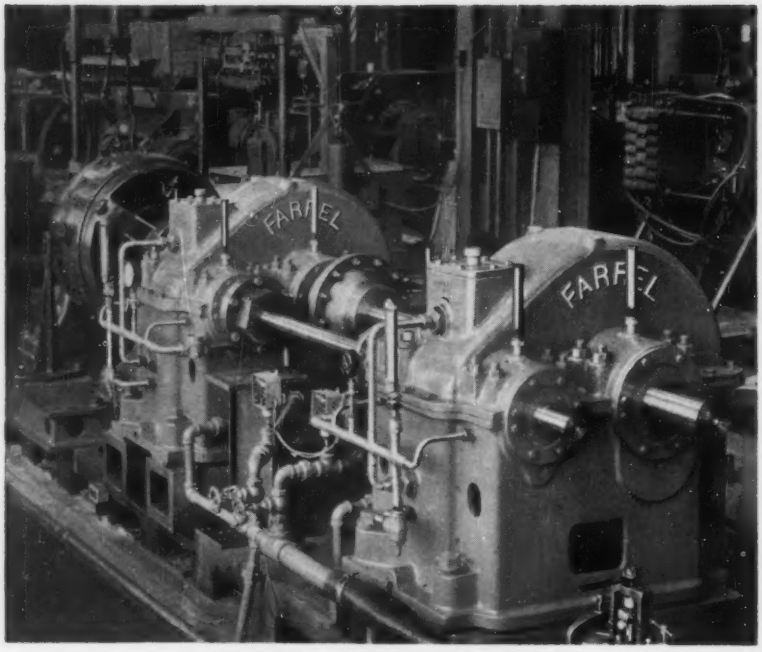
May we tell you more about CINCINNATI Dial Type Milling Machines? A complete list of Dial Type advantages and specifications is contained in catalog No. M-1915-2. Brief data will be found in Sweet's.

THE CINCINNATI MILLING MACHINE CO.
CINCINNATI 9, OHIO

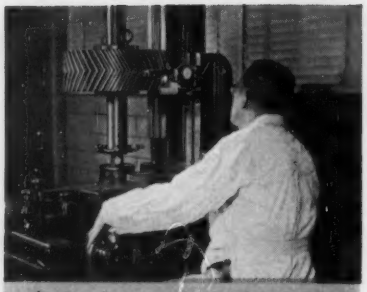
CINCINNATI

MILLING MACHINES • BROACHING MACHINES • CUTTER AND TOOL GRINDERS • METAL FORMING MACHINES
HARDENING MACHINES • OPTICAL PROJECTION PROFILE GRINDERS • CUTTING FLUID • GRINDING WHEELS

Farrel® speed reducers get a physical checkup

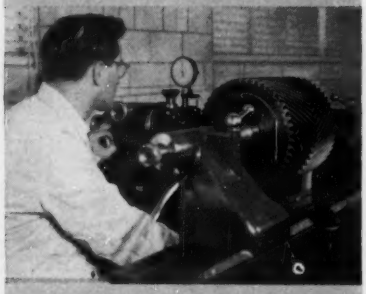


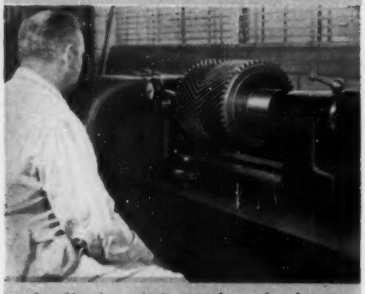
Setup for testing two high-speed units to observe performance under various conditions of load and speed.



▲ Involute tooth checker for measuring accuracy of profile.

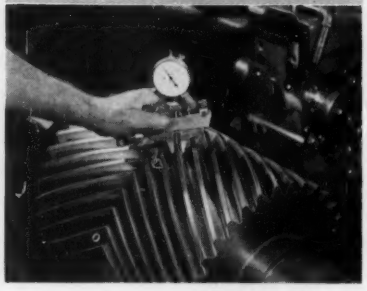
▼ Checking accuracy of tooth spacing.





▲ Checking helix angle or lead.

▼ Accuracy and uniformity of tooth thickness is checked with Farrel comparator.



Recently, the Farrel line of speed reducers was re-engineered, rerated and expanded to increase the horsepower in relation to size, and to extend the advantages of the units to additional applications.

A vital phase of this program was the physical research involved. The many improvements and consistent high quality found in the new line are a result of exhaustive experimentation which was carried on in connection with every aspect of speed reducer manufacture. Pictured here, are some of the facilities and equipment employed in the Farrel laboratory and shops for checking and testing gear units.

Toughness... stamina... long life ... these are the qualities of Farrel units which stem from the sound design, the high-grade materials, and the step-by-step precision that go into their making. Investigate the broad new line of Farrel speed reducers. For further details, send for a copy of Bulletin 450.

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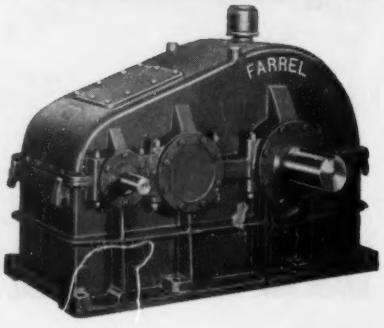
Plants: Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.
Sales Offices: Ansonia, Buffalo, Boston, Akron, Ann Arbor (Mich.), Chicago, Minneapolis, Fayetteville (N. C.), Los Angeles, Salt Lake City, Tulsa, Houston

Farrel-Birmingham®



FB-1116

Russia Plans More Pig Iron

British steel experts report Soviet process is up to that of any other country. Some 58.3 million tons annually is target for 1960. Siberia to get plants

SOVIET iron producing processes compare favorably with the best in the world, two English experts told the American Institute of Mining, Metallurgical & Petroleum Engineers.

E. W. Voice, head of the ironmaking division of the British Iron & Steel Research Association, and S. Klemantaski, senior scientific officer of the blast furnace laboratory, made a joint report based on exchange visits of West European and Soviet technicians and on technical literature from the USSR.

Production Up—The Englishmen said that Soviet pig iron production in 1955 reached 36.6 million tons and that 58.3 million tons were planned by 1960, the last year of the sixth five-year plan.

"The likelihood of this target being reached may be judged from the fact that previous five-year plans have been realistic," they said.

Ample Funds—The Soviet iron and steel industry is controlled by a special ministry, the paper pointed out, "with ample research funds and resources." It added that reserves of manganese ores are "virtually unlimited."

There are about 130 blast furnaces in the USSR today, with the tendency toward pig iron production in larger units—45,000 to 50,000 cu ft.

Raw Materials — The report stated that the Soviet is well provided with ore, coking coal, flux and water, but noted that "in spite of extensive washing, the coke used in the south is high in ash content, requiring extensive sintering and beneficiation of iron ores."

Russia's great rivers, in addition to supplying water for blast furnaces, are being considered as power sources for electric furnaces.

Artificial—Noting that the south Russian ironmaking area developed naturally from the presence of raw materials and accessibility to markets, the report said the Ural region was developed artificially.

Markets for Ural iron and steel were created: "By building nearby heavy industrial enterprises, such as machine tool plants, steelworks, chemical and electrical plants and facilities for the manufacture of railway wagons, tractors and automobiles."

A similar development is planned for Siberia, they said. Owing to manpower difficulties, the Siberian works will be highly automated.

200 Indians To Train in U.S.

The eight largest U.S. steel companies and five American colleges will start training the first of 200 Indian engineers in production and management methods on Sept. 1.

The Ford Foundation has granted $1.5 million to the Indian government to provide living expenses and tuition at the technical colleges for one year. The Indian government will provide travel expenses, and the steel companies will stand the cost of training in their plants.

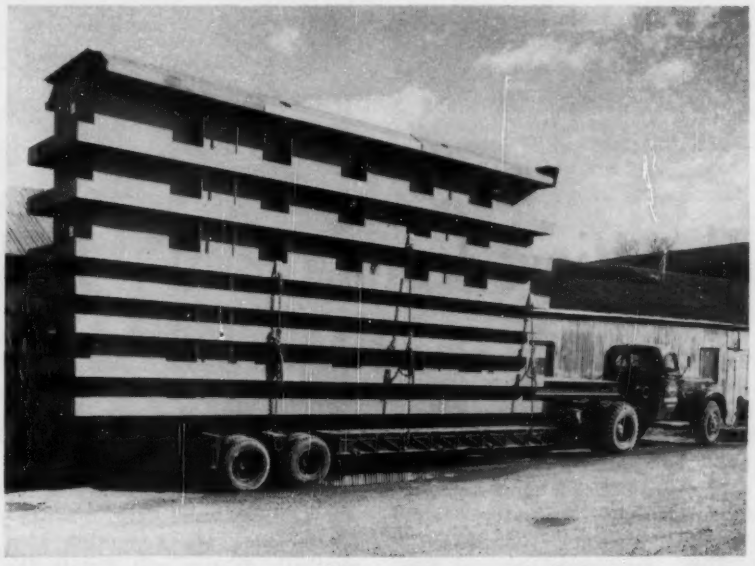
Participating companies: U.S. Steel Corp., Bethlehem Steel Co., Republic Steel Corp., Jones & Laughlin Steel Corp., Youngstown Sheet & Tube Co., National Steel Corp., Inland Steel Co. and Armco Steel Corp.

Participating colleges: Carnegie Institute of Technology, Case Institute of Technology, Illinois Institute of Technology, Lehigh University and University of Cincinnati.

Morocco To Get $20 Million

Morocco will receive $20 million from the U.S. government under the International Co-operation Administration for the development and purchase of commodities.

Among commodities to be supplied are machinery and hardwares, petroleum products, sugar, textiles and tea. Expansion and development are planned for Morocco's mineral deposits which include iron ore, copper, lead, zinc, tin, manganese and phosphates.



Huge Processing Tank Is Ready for Shipment

This tank is said to be one of the largest ever built for anodizing aluminum. Its dimensions: 26 ft long, 5 ft wide, 14 ft deep. Built by the Metal Finishing Division of Frederick B. Stevens Inc., Detroit, it has a solution capacity of over 13,500 gallons (60 tons). It has a 3/16-in. Koroseal lining

Laundry makers brainstormed these ideas for . . .

Home Laundries: Imagineered to 1965

Small washer-dryer units for each room in the house.

Sound devices on each machine to repeat operating instructions to housewife.

Memory tape controls to operate the equipment.

Ultrasonic "walk-in" cleaning cabinets—just move through them and come out with clean, freshly pressed clothes.

Build-it-yourself laundry equipment kits for the custom home.

System to re-use water.

Automatic ironer with folding and stacking device.

Do-it-yourself trim so the housewife can redecorate the room to match the appliance or vice versa.

Reinforced plastic shells that eliminate finishing of equipment.

Permanent cleaning fluid or gas.

Chemically treat fabrics to have "memory" creases built in.

Automatic cleaning compound feed systems—from storage reservoirs to equipment.

One-shot compound which will wash, bleach and dry clothing.

Use of radioactive tracers in garments so that they can be automatically sorted and loaded into equipment.

Washer-dryer-ironer units.

Heat pump combination that'll control home atmosphere as well as dry clothes.

Eliminate noise and vibration of equipment.

Develop economical fabric for a garment that can be worn once, then thrown away.

The View from "Cloud 13"

THINKING ALOUD about 1965 in the presence of competitors may seem naive. But executives from 23 home laundry manufacturers and their allied suppliers tried it at the American Home Laundry Manufacturers' Association convention.

They imagineered several versions of the 1965 home laundry—some of the ideas are given above—in a brainstorming session. Consensus of the experiment: Interesting and worthwhile.

Challenging—Executives participating in the "cloud 13" exercise admitted the experiment was fun—but it was also challenging. It even carried some somber undertones—perhaps the industry as it's known today won't exist in 1965.

One executive suggested that synthetic fabrics will dictate the future washing machine. It could be a plain tank in which the housewife merely dips garments into a permanent cleaning solution for the complete cleaning process. Specific cleaning solutions will be used for specific fabrics and will be metered automatically to and from central storage reservoirs.

Another executive ventured that electronics or ultrasonic cleaning cabinets may be 1965's laundry and that the industry will be primarily engaged in electronics.

Memory Creases—A chemical industry representative said that synthetic fabrics with built-in "memory" creases are a possibility. After the clothes are cleaned, their exposure to heat will restore the original freshly pressed look.

A panel set the pace and served as a warmup session for the brainstorming. Speakers gave the executives an idea of what to expect in the way of basic materials, design trends, components and washing compounds.

Headache—Martin Bartling, a contractor from Knoxville, Tenn., said that the servicing of appliances is the major builder headache. He challenged builders to design equipment with prewired and preplumbing packages for greater flexibility in the modern home, to overhaul their distribution methods and to adopt more standardization so that appliance units of one manufacturer would blend with those of another. "After all," he pointed out, "it's only human for a housewife to feel that company A makes the best refrigerator, but company B's range is superior."

Looking ahead at the use of steel, W. B. Nixon of Armco Steel Corp.'s market development division related that an economical one-coat, one-fire enameling iron is just around the corner. "Basic metallurgical research is completed," he said. "The next step is to work out the techniques in the enameling shop."

Automatic—To help make the laundry equipment versatile and automatic, Mr. Nixon pointed to the new electrical steels used for memory cores in electronic computers. "Your machines, through these memory tapes, will be able to wash, dry and iron each piece the way the housewife desires."

John Willard, manager of sales development at Aluminum Co. of America, said you can expect spectacular developments in new processes for the fabrication of alumi-

num and in new stronger, more heat resistant alloys. New surface treatment techniques will bring brighter, more durable color finishes to the material.

Previewing future paints and enamels, Tom Armel, general manager industrial sales for Glidden Co., promised prime coatings for metal which will permit fabrication processing without damage, so that only one enamel coat will be required to finish the appliance. Mr. Armel said that his firm is developing adhesives which will permit the joining of metal without the use of conventional fasteners and welding.

Large Audience — Guenther Baumgart, executive director of AHLMA, showed that brainstorming with a large group is possible —approximately 150 laundry executives participated in this one.

Mr. Baumgart conducted the session for 40 minutes and permitted no discussion or evaluation of ideas during this period. An evaluation period followed. Here are some comments on ideas presented:

Small washer-dryer units for several rooms in the home. John A. Kovas, assistant vice president of Dole Valve Co.: "Why not? I already have three television sets in my home."

Develop system for re-use of water. F. H. McCormick, assistant chief engineer of Frigidaire Division of General Motors Corp.: "We're already recirculating water in the washer. It should be only an extension of this development with filters, etc., to complete the cycle."

Do-it-yourself trim—to match appliances with room or vice versa. Pierce Sperry, president of Sperry Rubber & Plastics Co.: "Already a possibility. We have vinyl plastics with adhesives which would be used. Westinghouse, I believe, is currently using some sort of plastic trim which has a pressure sensitive adhesive."

Use reinforced plastics to eliminate painting and finishing operations. Thomas A. DeMarco, manager of industrial applications for Monsanto Chemical Co.'s plastics division: "Westinghouse is producing a reinforced plastic refrigerator cabinet. Material costs are higher, but this is balanced out by lower die costs."

Elimination of noise and vibration. Mr. Kovas: "I think we'll see greater use of combined hydraulics, pneumatics and electronics in our equipment to accomplish this."

One junior research executive summed up AHLMA's brainstorming experiment: "It's pretty obvious that many of the ideas presented have already been studied—some are well along toward final development. Perhaps the greatest value of the sessions was in exposing the top brass to what others in the industry are really thinking about. It should make it easier for us in research and development to sell and get support for the new ideas we come up with in the future."

Health Room—1965 Style. Today's bathroom will be the next area in the modern home to undergo a radical change, believes Joseph R. Mango, Chicago industrial designer. Here he depicts his conception of its evolution from bath to healthroom: Sun lamp and table, exercising equipment, built-in laundry equipment at rear left, enclosed cabinets for toilet and shower in rear center, large pool-type bathing facility in foreground. Three-dimensional television will help make it more a "family room" than today's "personalized" type

ODM Approves Tax Write-Offs

Accelerated tax amortization on 32 new or expanded facilities was approved by the Office of Defense Mobilization in the two-week period running from Mar. 21 through Apr. 3. The amount certified was $177,974,585.

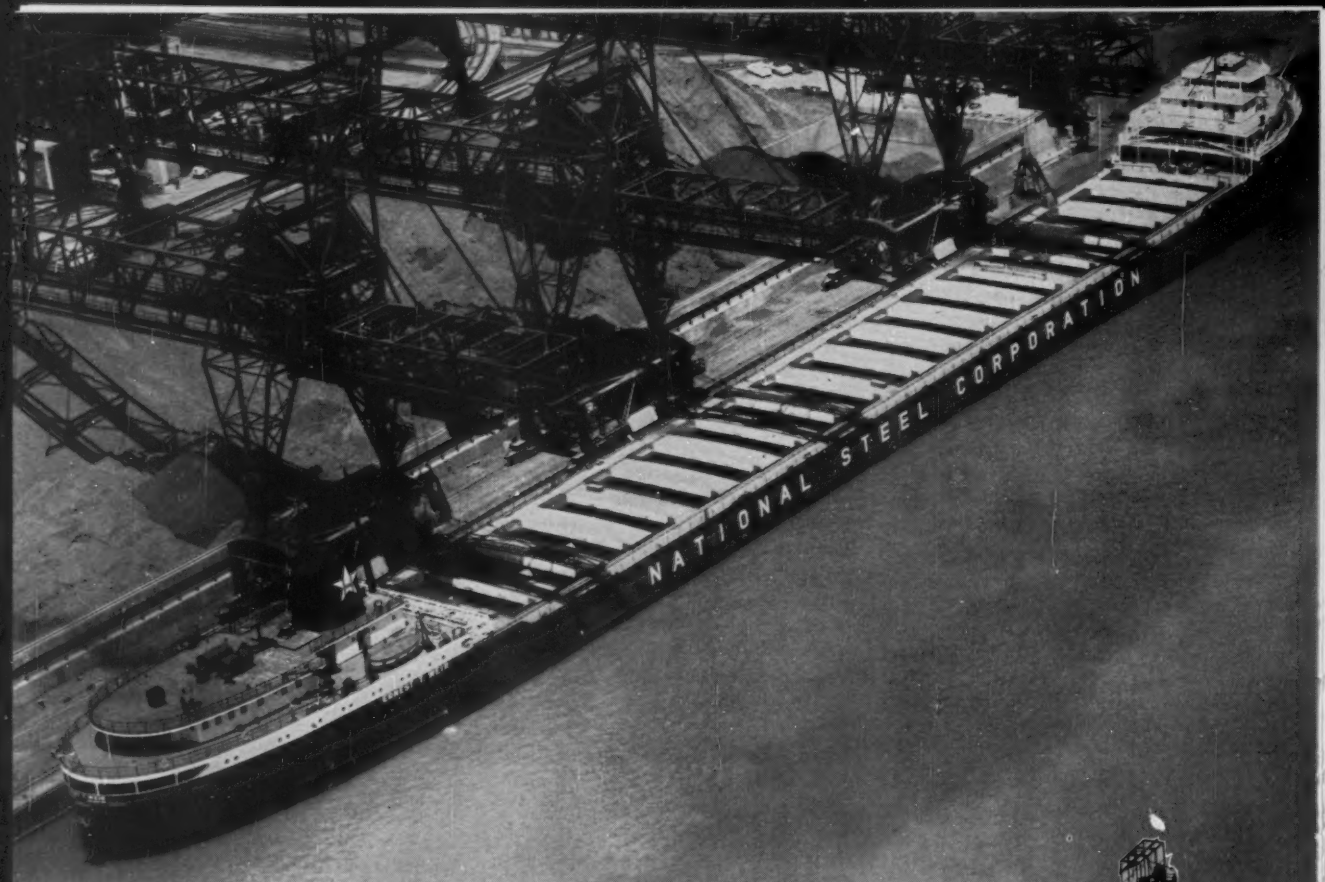
Included was a write-off of $7,188,851 for zirconium and hafnium metal facilities at the Carborundum Metals Co., Parkersburg, W. Va. New England Metallurgical Corp., Norwood, Mass., and Alloy Steel & Metals Co., Los Angeles, both producers of steel castings, were granted $375,000 and $105,000.

To date, ODM has authorized rapid depreciation for 21,843 projects with a total cost estimated at $37,643,942,000.

Priority Help for Contractors

Defense contractors with DX rated orders may now use DX-D-9 to obtain supplies necessary for maintenance, repair and operations under the Defense Materials System.

To expedite delivery of required products and materials to contractors, the Business and Defense Services Administration issued amendments to DMS Regulations 1 and 2. Use of DX-D-9 is authorized when inability to obtain supplies would result in failure to fill a DX rated order.



How Great Lakes Steel *launches* quality

You're at 400 feet, banking for a good close look at the unloading operation of the *Ernest T. Weir*. She's packed to the gunwales, stem to stern, with ore—tons of iron-bearing food for Great Lakes hungry blast furnaces.

What's this got to do with turning out top-quality steel at Great Lakes? Plenty! For quality pig iron can only come from quality raw materials—like the *Weir's* rich cargo. And, of course, quality pig iron is the very backbone of top-quality steel.

Control of quality at Great Lakes begins right at the mines. In fact, each ore source is picked with painstaking care. Then, repeated checks in the mines—*double checks* here at the unloading docks—put the quality of Great Lakes raw materials beyond question!

It's that kind of control (from start to finish) that gives our flat-rolled products uniform quality—assures that they will reach our customers exactly when and as ordered. We're ready to talk your steel needs whenever you are.

GREAT LAKES STEEL CORPORATION

Detroit 29, Michigan • Division of

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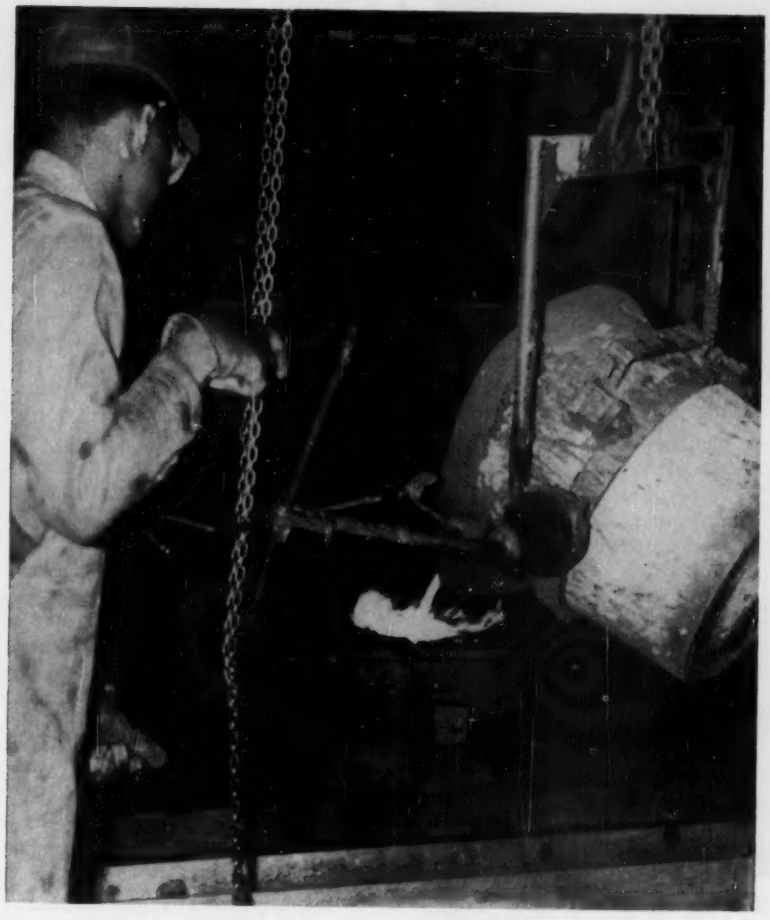
District Sales Offices: Boston, Chicago, Cincinnati, Cleveland, Grand Rapids, Houston, Indianapolis, Lansing, Los Angeles, New York City, Philadelphia, Pittsburgh, Rochester, St. Louis, San Francisco, Toledo, Toronto.

TO ASSURE TOP-QUALITY OPEN-HEARTH STEEL . . . iron ore (shown stockpiled here), coal and limestone—all of known source and quality—are sampled and tested over and over again by Great Lakes Steel raw material analysts.



More captive production, new plant locations mean . . .

Auto Foundry Markets Shift

QUIETLY, but inexorably—markets for auto suppliers are shifting. A case in point: The gray iron jobbing foundries.

They are caught in a three-way pattern change:

1. Auto plants are dispersing, so foundries closer to new facilities are getting more automotive work.

2. When auto production is slow, more gray iron work is pulled back to captive plants.

3. Competition with lighter materials, notably aluminum, is sharpening.

Dispersion—The construction of new automotive plants in northern Ohio may be one reason why Toledo job shops are booming and many Detroit founders are slack. Toledo operating rates are some 20 per cent higher than those in Detroit. (Detroit foundrymen also charge price cutting is a factor.)

Another problem Detroit job shops will have to face shortly stems from the move of automotive manufacturing plants into the Ohio valley. It will become more profitable for auto makers to place orders with nearby Ohio foundries which will ship finished parts directly to the plants. Although such a development hasn't started, it shows signs of getting under way.

Captives—Auto output for the past four weeks has fallen below comparable weeks in 1956. That always starts adjustments among suppliers. First quarter earnings and vehicle sales (see page 66) show that General Motors Corp. has been particularly hard hit.

The changes in tool and die programs also hit gray iron jobbers. Die programs for 1959 models have been held up for additional changes following some of this year's styling fiascos. (The 1958 programs already have been modified.) There's some hope for optimism, however. GM's Fisher Body Division and Ford Motor Co. will be breaking loose more 1959 programs by the end of this month. Chrysler Corp. probably will follow in June.

Competition—In the drive to cut down weight, auto engineers are turning frequently to aluminum. Gray iron, for example, lost out when Chrysler Corp. and Chevrolet shifted to aluminum transmission housings. Other auto makers will be following suit in '58 and '59—not only with housings, but with dozens of smaller parts.

Is all gloom, then, for gray iron foundries? No. Some of the shifts simply mean different job shops get the work. And many gray iron foundrymen right in Detroit are doing well in automotive work.

Safe at Home—Atlas Foundry Co., Detroit, is a good example. It has had more than 20 years' experience in pouring body and quarter panel dies. W. B. Crawford, president, explains the company probably won't have too much trouble getting these jobs because it has the experience and equipment to turn out complicated body

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First Quarter Earnings

	Net Earnings (Millions)		Dollar Sales (Millions)		Earnings Per Share		Sales (Thousands of units)	
	1957	1956	1957	1956	1957	1956	1957	1956
*Chrysler	$ 46.5	$10.9	$1,150.7	$742.3	$5.34	$1.25	421	305.0
Ford	100.5	73.7	1,569.5	1,203.1	1.85	1.37	626	523.0
GM	261.0	283.0	3,077.0	3,065.0	0.93	1.01	944	1,093.6

*Chrysler figures indicate shipments instead of vehicle sales.

dies, large fixtures and bases.

Mr. Crawford believes his answer lies in keeping quality high, reducing costs by modernizing wherever possible and taking on the tough work. As an example of its technological approach, Atlas is investigating the possibility of getting a license to pour nodular iron.

UAW Hits FMC Speech

Walter Reuther, UAW president, has let loose another blast at auto company pricing policies. This time the opportunity came from a speech given by John Bugas, Ford's vice president of industrial relations.

Mr. Bugas warns that excessive demands by labor unions are the basis for inflation. Says Mr. Bugas: "There is serious evidence that inflation is being fostered and capital formation discouraged by attempts of organized labor to seek wage and fringe benefits which the economy cannot safely absorb."

He points out that average hourly earnings in manufacturing increased 10 per cent from mid-1955 to the end of 1956. "Output per man-hour rose only 2 per cent a year for the economy as a whole in 1955-56," adds Mr. Bugas.

In effect, his speech bolsters auto makers' claims that wage increases are responsible for price hikes.

Rebuttal—Mr. Reuther couldn't let this opportunity go by. He comes back with evidence showing Ford set initial 1957 car prices in September at 2.9 per cent above those of the previous year.

At that time, Ford said this increase covered higher costs of materials and manufacturing costs (including labor).

But after Chevrolet announced its prices, Ford revised price structures upward. Mr. Reuther claims this was done to keep even with a competitor. He concludes that profits had been ample to cover increased costs.

Mr. Reuther sums up the UAW's position thusly: "Present inflation is rigged since it's based on prices set by a handful of corporate executives."

Build-Up — These are the two sides of the old wage vs. price struggle which shows signs of a revival in motordom. Mr. Reuther points out the union welcomes a Kefauver committee probe into automotive pricing policies. He adds that car builders haven't expressed a similar desire.

The UAW may have quite a wait before the government gets around to Detroit. At the moment, a study group is preparing a report on wage and price problems in all industries. This will be presented to the Senate subcommittee in the near future.

Then, and only then, will the subcommittee make up its mind as to whether it will conduct any investigations and if so, which area will be first.

Auto makers may be passed over in favor of another industry. The decision probably will be made within a month.

Exhaust Notes

• Carl E. Fribley, past president of the National Automobile Dealers Association, has told the Automobile Old Timers Council that dealers may be facing red ink in '57.

He says: "Unethical advertising, high pressure, misleading merchandising gimmicks cannot and will not produce profitable volume on a permanent basis."

• It's rumored that Chevrolet is installing aluminum anodizing equipment at Flint, Mich., for trim items—eventually bumpers.

• The Oldsmobile Division reports it used 175,000 tons of steel from Pittsburgh area mills alone in 1956.

• Firestone of Canada has started a multimillion dollar expansion of production facilities and equipment at its Hamilton, Ont., plant.

• The Ford Fairlanes, Chevrolet Bel Airs and Plymouth Belvederes are being scheduled at an all-time high rate of 27 per cent of industry passenger car production this year, compared with 22.8 per cent in early 1956.

• Truckmakers are coming into the light and medium duty, 4-wheel drive vehicle market at such a rate that production may reach 100,000 this year, compared with 75,000 in 1956. Among seven producers of light trucks (Willys, GMC, Chevrolet, Dodge, International, Ford and Studebaker), only the last two offer no 4-wheel drive model.

U.S. Auto Output

	Passenger Only	
	1957	1956
January	642,089	612,078
February	571,098	555,596
March	578,826	575,260
3 Mo. Total	1,792,013	1,742,934
April		547,617
May		471,617
June		430,373
July		448,876
August		402,575
September		190,726
October		389,061
November		581,803
December		597,226
Total		5,802,808

Week Ended	1957	1956
Mar. 30	130,233	125,850
Apr. 6	130,318	129,829
Apr. 13	126,194	136,038
Apr. 20	118,327	129,826
Apr. 27	123,555†	127,189
May 4	125,000*	132,889

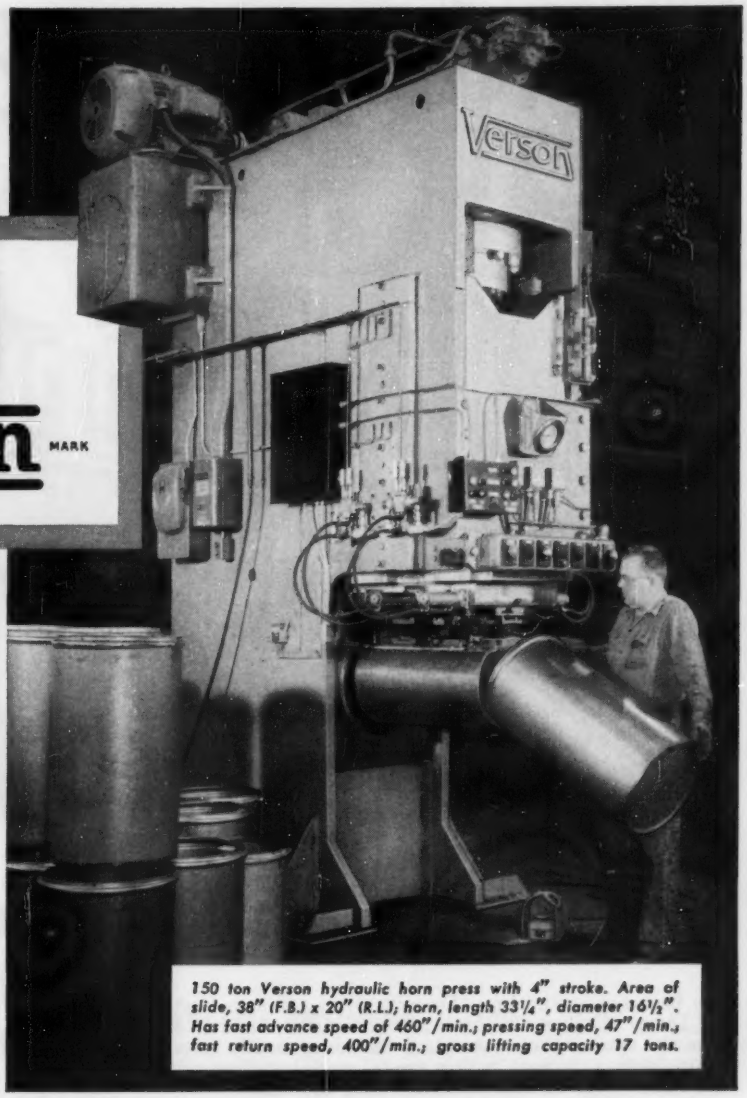
Source: *Ward's Automotive Reports.* †Preliminary. *Estimated by STEEL.

150 TON

TRADE **Verson** MARK

hydraulic HORN PRESS

coins and pierces openings on power line transformer containers



150 ton Verson hydraulic horn press with 4" stroke. Area of slide, 38" (F.B.) x 20" (R.L.); horn, length 33¼", diameter 16½". Has fast advance speed of 460"/min.; pressing speed, 47"/min.; fast return speed, 400"/min.; gross lifting capacity 17 tons.

This 150 ton Verson hydraulic horn press is in use at the Gadsden, Alabama, Works of Allis-Chalmers Manufacturing Company.

The press is employed to automatically coin and pierce 3 different openings, to accommodate various sized leads coming into power line transformer containers. When actuated, the press has a two stroke cycle. A combination coining and piercing die coins the part on the initial stroke—the second stroke is a piercing operation.

The press is equipped with full automatic electrical control and has varying tonnage control for each of the three stations. By pre-selection, the operator may exert the proper tonnage required to do each specific job.

This hydraulic horn, like all Verson machines, is much more than just a press. It's a production process, engineered and built to provide greater efficiency and production with reduced costs.

Put Verson's production know-how to work for you. Send an outline of your requirements —we'll make specific recommendations.

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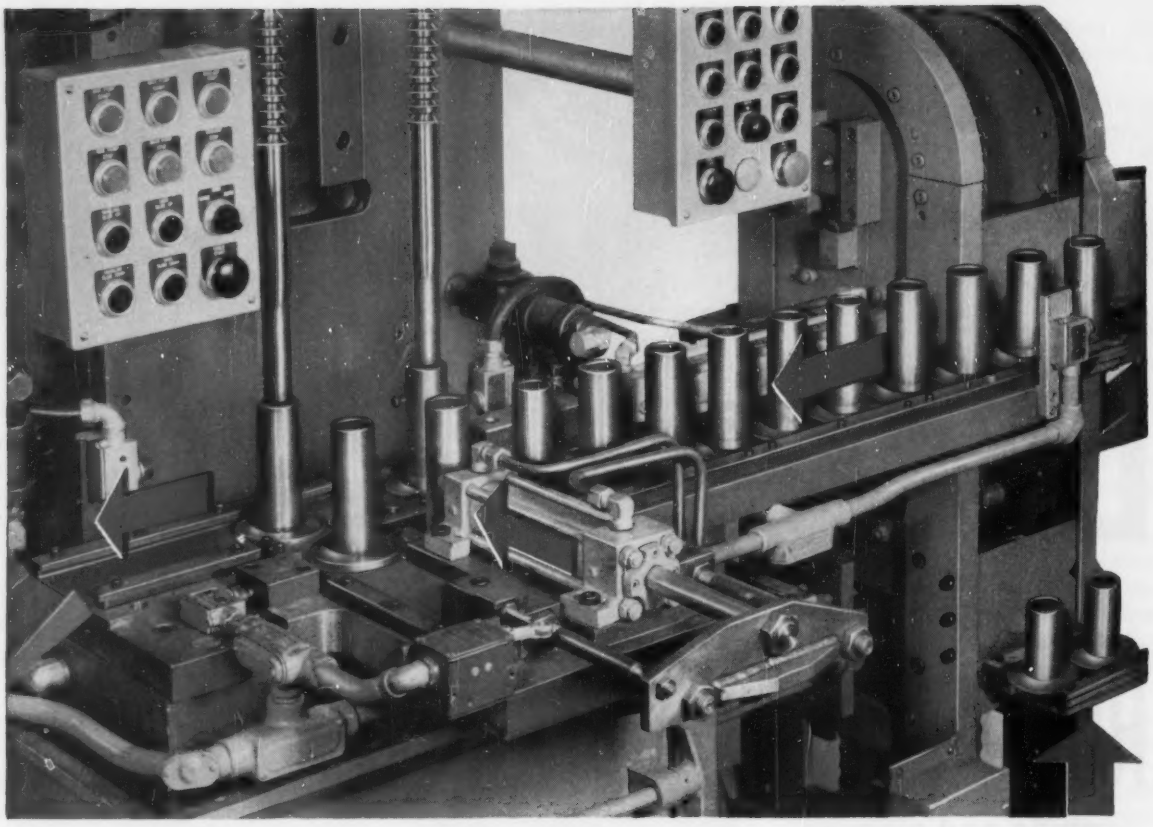

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This broaching setup on a Detroit 15-ton, 42-inch Vertical Pull Down Machine illustrates *practical* automation! It combines the economy of a standard machine, readily retooled for production changes, with a special work handling system that makes floor-to-floor operation fully automatic.

Flanged work pieces are loaded at floor level, conveyed to an elevator, raised, pushed off and shuttled into broaching position, broached and unloaded . . . all without an operator. Each broaching stroke sizes the I.D. and removes excess welding at the flange joint. Parts are handled as fast as they can be supplied by the "automatics" ahead of this operation.

The same broaching specialists who created this productive combination of "standard and special" can help solve *your* production problem. Send parts, prints or details now.

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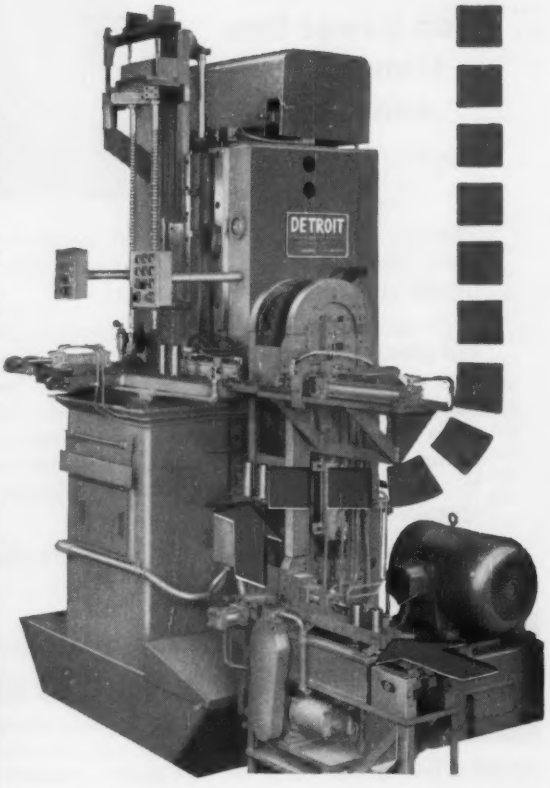

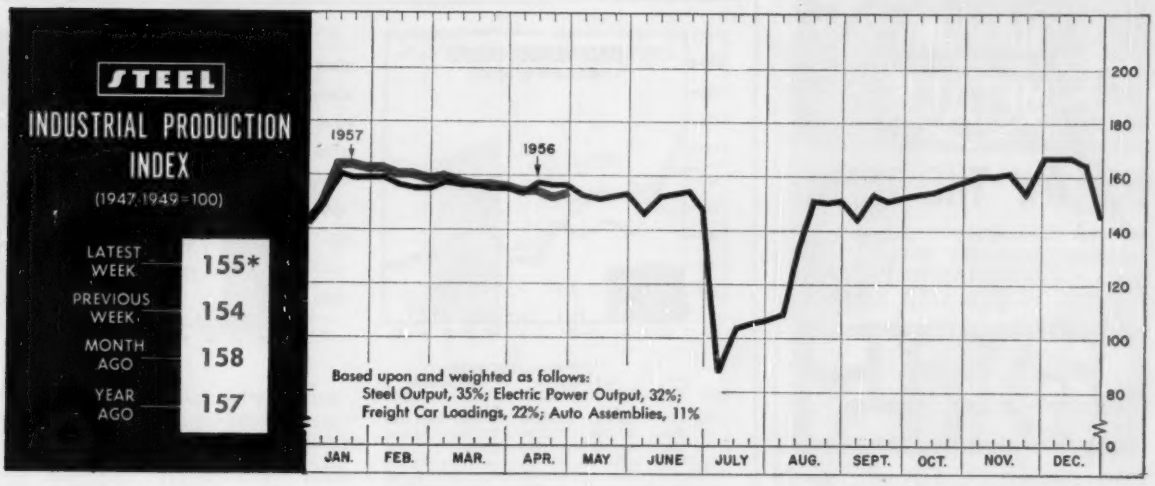

*Week ended Apr. 27.

Construction, Equipment Bolster Economy

CONSTRUCTION and heavy machinery, two of the fastest runners in the 1956 production race, seem to be record bound. In the process, they could boost the standing of the whole production team.

On the basis of first quarter performances, both are setting the hottest pace ever. Most construction figures point to the best year in history despite the drastic decline in housing starts. Construction put in place hit $9.157 billion in the initial quarter, according to the Commerce department. That's a year-to-year gain of 4 per cent.

Differences—The future of construction is clouded by the seeming differences in the statistics on contract awards. Two sources—F. W. Dodge Corp. and Dun & Bradstreet Inc.—agree that awards and permits are running at an all-time high. Dodge, which now bases its findings on surveys of all 48 states, declares that March was the best ever for that month, rounding out a record first quarter. The advantage over 1956's first quarter: 4 per cent. D&B, which measures building permits in 217 cities, reports a value of $543,988,151 for March, up 8.1 per cent from the year-ago period. This erased the deficit of the first two months of 1957, leaving the first quarter figure 1.7 per cent ahead of last year's first quarter.

Engineering News-Record, which reports heavy construction awards, has noted an increase over the last two or three weeks. But its cumulative total for the first 17 weeks of 1957 still lags that of the corresponding year-ago period by a whopping 21 per cent. As large as these variations appear, there is little doubt within the industry that there is enough work scheduled for the rest of this year to top 1956's $44.3 billion record.

Equipment Strengthens—Makers of heavy equipment are little worried about any cutbacks this year. Machine tool makers are almost unanimous in their expectation of

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,269[1]	2,278	2,373
Electric Power Distributed (million kw-hr)	11,500[1]	11,485	10,867
Bituminous Coal Output (1000 tons)	10,195[1]	9,900	9,785
Petroleum Production (daily avg—1000 bbl)	7,500[1]	7,551	7,146
Construction Volume (*ENR*—millions)	$439.6	$394.5	$526.0
Auto, Truck Output, U. S., Canada (*Ward's*)	161,125[1]	151,358	163,136
TRADE			
Freight Car Loadings (1000 cars)	685[1]	687	778
Business Failures (Dun & Bradstreet)	302	308	252
Currency in Circulation (millions)[3]	$30,610	$30,681	$30,155
Dept. Store Sales (changes from year ago)[3]	+13%	+7%	+1%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$20,933	$21,137	$22,384
Federal Gross Debt (billions)	$274.4	$274.6	$276.0
Bond Volume, NYSE (millions)	$23.4	$15.6	$21.5
Stocks Sales, NYSE (thousands of shares)	13,413	8,672	12,610
Loans and Investments (billions)[4]	$87.3	$86.9	$85.5
U. S. Govt. Obligations Held (billions)[4]	$26.3	$26.3	$27.7
PRICES			
STEEL's Finished Steel Price Index[5]	227.41	227.41	209.10
STEEL's Nonferrous Metal Price Index[6]	239.7	239.7	277.9
All Commodities[7]	117.3	117.2	110.4
Commodities Other Than Farm & Foods[7]	125.4	125.3	115.7

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

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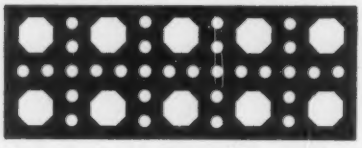

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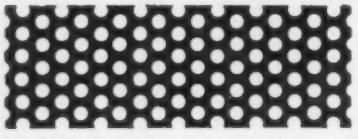

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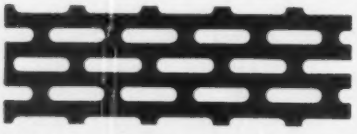

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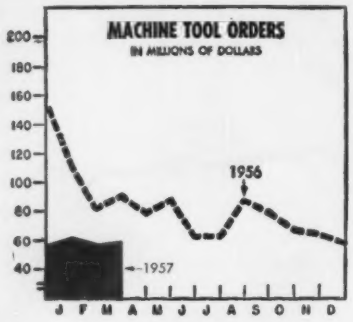
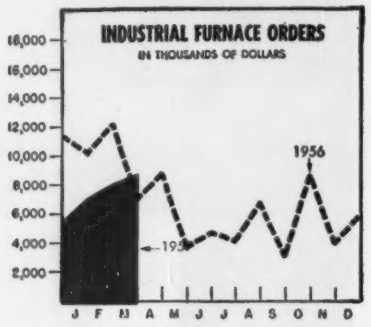
THE BUSINESS TREND





(Thousands of dollars)

	New Orders 1957	New Orders 1956	Shipments 1957	Shipments 1956
Jan.	63,250	109,550	76,550	54,600
Feb.	58,200	81,300	77,700	64,600
Mar.	60,000*	89,500	89,850*	74,150
Apr.	.....	79,300	.....	71,800
May	.....	87,100	.....	76,800
June	.....	61,850	.....	76,250
July	.....	61,900	.....	65,150
Aug.	.....	87,500	.....	75,100
Sept.	.....	78,450	.....	71,100
Oct.	.....	66,100	.....	89,750
Nov.	.....	64,250	.....	81,700
Dec.	.....	57,200	.....	85,150
Totals	.....	924,000	.....	886,150

*Preliminary.
National Machine Tool Builders' Assn.
Charts copyright, 1957, STEEL.

	1957	1956	1955
Jan.	7,380	10,244	4,973
Feb.	8,373	12,163	5,616
Mar.	9,090	7,025	7,345
Apr.	....	8,803	7,639
May	....	3,620	6,205
June	....	4,748	5,812
July	....	4,140	4,338
Aug.	....	6,722	6,278
Sept.	....	3,057	8,351
Oct.	....	8,741	9,575
Nov.	....	3,986	6,180
Dec.	....	5,858	11,105

*Not including new orders for steel mill furnaces.
Industrial Heating Equipment Assn. Inc.

another banner year. While new orders in first quarter were down (see chart above), shipments were well above the 1956 monthly average. Backlogs are still large. In March, industrial furnace producers reported the largest volume of new orders since February, 1956 (see chart above).

In February, foundry equipment producers had their best month since last August. The new order index rose from 117.9 in January to 188.4 (1947-1949=100). The 1956 monthly average was 133. The resistance welder manufacturing industry shipped $3.3 million worth of equipment in March, making the seventh month out of the last nine that the $3 million figure has been reached. Gear manufacturers, who supply practically all heavy equipment makers, are willing to bet on a good 1957. In March, their sales index hit 262.4 (1947-1949=100), the best showing since last October.

Business Failures Rise

Business failures reached 1336 in March, the highest number recorded for that month since 1939. It also marked the first time that any month exceeded the corresponding 1939 period since the end of World War II.

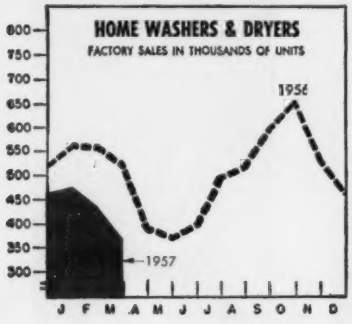
However, the rate of failures was at a slower pace than in prewar years because of the growth of the business community. There were 55 failures in March for every 10,000 companies listed in D&B's *Reference Book*. This was considerably under the 61 per 10,000 firms in the 1940 month and 72 per 10,000 in March, 1939.

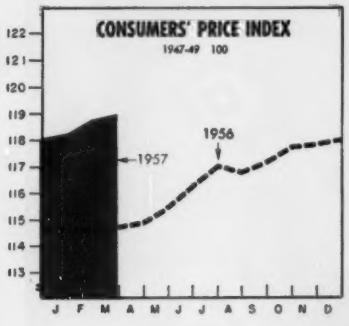
PAs Sound Blue Note

A faint but audible blue note came out of the monthly business survey of the National Association of Purchasing Agents. New orders and production were the same in April as they were in March.

Reasons: 1. Fewer housing starts. 2. Lower automobile production. 3. Reduction in steel output. 4. Drop in appliance sales.

But most purchasing executives said business was good—but not as good as they expected. A majority (58 per cent) expect prices to edge up later this year due to an increase in labor costs. Competition will prevent producers from passing all the increase along, they believe, which will





	Washers		Dryers	
	1957	1956	1957	1956
Jan.	331,314	393,717	144,621	166,243
Feb.	319,580	405,631	114,517	148,522
Mar.	286,205	405,744	83,668	113,031
Apr.	.....	324,238	.....	64,923
May	.....	315,249	.....	55,330
June	.....	340,235	.....	58,441
July	.....	380,172	.....	117,548
Aug.	.....	373,925	.....	144,537
Sept.	.....	402,631	.....	192,724
Oct.	.....	449,409	.....	206,929
Nov.	.....	357,935	.....	170,529
Dec.	.....	298,368	.....	162,953
Totals	.....	4,447,254	.....	1,601,710

American Home Laundry Mfrs. Assn.

	1957	1956	1955
Jan.	118.2	114.6	114.3
Feb.	118.7	114.6	114.3
Mar.	118.9	114.7	114.3
Apr.	....	114.9	114.2
May	....	115.4	114.2
June	....	116.2	114.4
July	....	117.0	114.7
Aug.	....	116.8	114.5
Sept.	....	117.1	114.9
Oct.	....	117.7	114.9
Nov.	....	117.8	115.0
Dec.	....	118.0	114.7

U.S. Bureau of Labor Statistics.

tighten the profit squeeze.

Only 25 per cent reported paying more for items, the smallest number in this category since 1954. A large majority (66 per cent) report steady prices, and 9 per cent say they are paying less.

In April, 37 per cent indicated reduced inventories. In the first quarter, 22 per cent reported this way, which indicates a trend toward further, gradual reduction at least for the next two months.

In employment, 56 per cent showed no change; 31 per cent reported less employment; and 13 per cent showed an increase.

Laundry Appliances Off

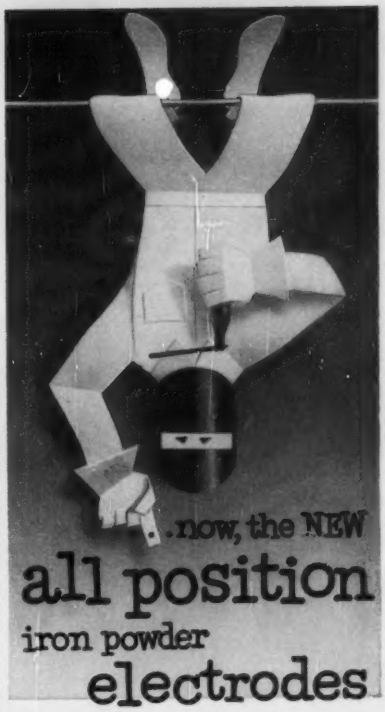
Domestic factory sales of home laundry appliances for the first quarter of 1957 amounted to 1,351,808 units, a drop of 18 per cent from the first quarter of 1956, reported Guenther Baumgart, executive director of the American Home Laundry Manufacturers' Association.

Washer-dryer sales totaled 21,527 units in March, a gain of 6 per cent over February. Washer sales amounted to 286,205 units in March, 10 per cent below February and down 29 per cent from March, 1956. Automatic and semiautomatic washer sales were 211,356 units in March, 13 per cent below February and 28 per cent under March last year. (See chart above.)

Trends Fore and Aft

• Edward G. Budd, president of Budd Co., predicts that railroads will order more passenger cars in the next year than they did in the last two years. A continued interest in freight cars is shown by Southern Railway System's order for 2650 new ones costing an estimated $27.5 million.

• This will be a good year for the steel and iron ore industries, predicts Alex O. Brown, chairman of Cleveland-Cliffs Iron Co., Cleveland. Mr. Brown told the company's annual shareholders' meeting: "General business conditions in the U.S. in 1957 are expected to be good despite a few clouds on the economic horizon." He forecasted keener competition and noted a problem: "Allowable depreciation is completely inadequate under present internal revenue regulations to cover necessary capital expenditures for replacement of mines being exhausted and of worn out plant equipment."



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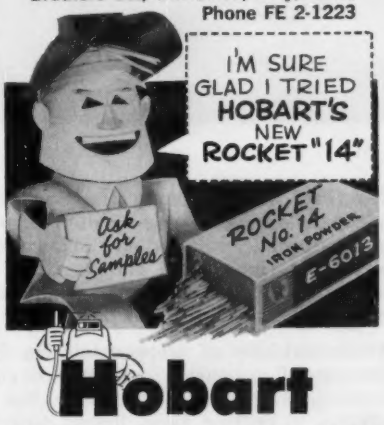

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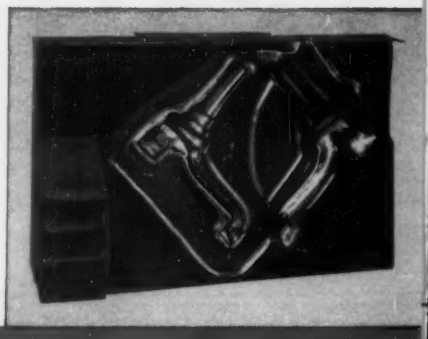

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Holding close tolerances in the production of these automobile spindles calls for die blocks that can really stand up under rough duty. This company found the answer in Heppenstall Hardtem Die Blocks . . . and important, too, is the longer than usual production runs they get before resinking.

Machinability of Heppenstall Hardtem is another feature well recognized by veteran die sinkers. This long standing Heppenstall reputation has been built by savings in cutting time, longer tool life, and more accurate sinkings.

Forged on all six faces from special Heppenstall Steel, Hardtem and other Heppenstall Die Steels are manufactured in a wide hardness range to match varying customer requirements of service and machinability.

If you have a problem of die block machinability or service life, contact your Heppenstall Representative. He can quickly get the one best answer for you.

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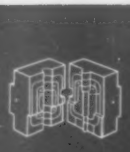
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H. DANIEL ROBB
Ryerson alloy steels sales

R. Worth Vaughan was elected president, **American Smelting & Refining Co.**, New York. Formerly executive vice president, he succeeds **Kenneth C. Brownell,** now chairman. **Kershaw Harms** was elected a vice president. Retiring are **Roger W. Straus,** board chairman (who remains a director) and **John C. Emison,** finance committee chairman. **Oscar S. Straus** was elected chairman of the finance committee; **Forrest G. Hamrick,** treasurer.

Joseph F. Howard was elected executive vice president, **City Auto Stamping Co.**, Toledo, O. **William E. Peristy** was elected vice president-sales; **Robert Millard,** vice president-factory manager. The firm has voted to change its name to Globe-Wernicke Industries, effective July 1.

George B. Coale was elected a vice president of **National Lead Co.** He continues as general manager of the Baroid Division, with headquarters in Houston. **Joseph H. Reid** was made general manager, titanium division, New York. Formerly manager of the division, he is replaced by **Graham W. Corddry.**

Frederick Kober was made plant engineer and **Alex Tripson,** supervisor of industrial engineering at the Etna, Pa., plant, **Spang-Chalfant Division,** National Supply Co. Mr. Kober succeeds **Henry Seidel,** and Mr. Tripson succeeds **Frank Sanford.** They were recently named staff engineers in the manufacturing department at Pittsburgh.

William E. Mullestein was promoted to vice president-administration, **Lukens Steel Co.**, Coatesville, Pa. Formerly general sales manager, he is now in charge of sales, operations and purchasing. **J. Frederic Wiese,** vice president-commercial, was elected chairman of the management committee, replacing the late **G. Donald Spackman. John H. Faunce Jr.,** director of market and commercial development, assumes additional duties in charge of new metallurgical products and processes research.

Edward S. Aucoin was promoted from assistant purchasing agent to purchasing agent of **Delta Tank Mfg. Co. Inc.**, Baton Rouge, La., subsidiary of General Gas Corp.

Rudolph E. Boehme, chief engineer, was elected assistant vice president in charge of engineering and new product development at **Titan Mfg. Co.**, Buffalo.

Ray D. McMahon was made sales manager, steam generator division, **Clayton Mfg. Co.**, El Monte, Calif. He was with Southern California Gas Co.

Jack A. Cahilacomba was made Los Angeles district manager, scientific instruments division, **Beckman Instruments Inc.**

Columbia-Geneva Steel Division, U.S. Steel Corp., named **Donald W. Lasell** general superintendent at its Torrance, Calif., Works. He succeeds **C. C. Morgan,** recently made general superintendent at the Pittsburg, Calif., Works.

H. Daniel Robb was promoted from manager of alloy steel sales, St. Louis plant, to national product manager, alloy steels, for **Joseph T. Ryerson & Son Inc.** He has headquarters at the Chicago plant.

Charles F. Venrick was promoted to vice president-sales, western region, **American Car & Foundry Division,** ACF Industries Inc. He was division district manager at Chicago and continues headquarters there.

Robert McNeal Smith was made assistant vice president-sales at **Russell, Burdsall & Ward Bolt & Nut Co.**, Port Chester, N. Y. He was vice president in charge of eastern sales for Pittsburgh Screw & Bolt Corp.

James M. Nestor was made general sales manager of **Bostitch Inc.**, Westerly, R. I. He was manager of Bostitch-Western Inc., Los Angeles.

Lewis J. Cox was elected first vice president and chief executive officer of **Iron Fireman Mfg. Co.**, Cleveland.

Fred H. Lewis was named assistant general manager, cylinder gas division, **AirProducts Inc.**, Allentown, Pa.

E. W. Lapp was made purchasing agent for **Dynex Inc.**, Milwaukee. He held the same position at M. & W. Gear Co.

Continental Tooling Service Inc., Dayton, O., elected **Herbert C.**

L. B. SZAL

MILTON J. STEFFES

Super Tool Division vice presidents

WALTER J. BEYER

ROBERT G. JENSEN

engineering positions at Perfex Corp.

Stroh vice president and director of sales and advertising.

L. B. Szal was made vice president-production; **Milton J. Steffes,** vice president-sales and engineering for **Super Tool Division,** Van Norman Industries Inc., Detroit. Mr. Szal was production manager. Mr. Steffes was general manager-sales and engineering.

David D. Mason fills the new post of assistant general manager, **Link Aviation Inc.,** Binghamton, N. Y. He continues as a vice president.

Charles B. Lang was elected president, **Dominion Coal & Steel Corp.** and subsidiaries, Montreal, Que. He succeeds the late **L. A. Forsyth.**

A. Lyndon Foscue, Birny Mason Jr. and **Edwin B. Suydam** were elected vice presidents and appointed members of the appropriations committee of **Union Carbide & Carbon Corp.,** New York. Mr. Foscue is president of Electro Metallurgical Co. and Haynes Stellite Co. Mr. Mason is secretary of the corporation and president of Union Carbide Development Co. Mr. Suydam is president of Linde Air Products Co.

Edwin W. Munson was appointed special product development engineer, air gage division, **Dearborn Gage Co.,** Dearborn, Mich. He was with the Electro-Motive Division, General Motors Corp.

Metal & Thermit Corp. appointed **N. F. Kiernan** regional manager for welding products in the west central region with headquarters in East Chicago, Ind. **J. DeSanto,** acting regional manager at East Chicago, is undertaking additional field sales responsibilities in the Chicago area. **C. F. Delbridge** succeeds Mr. Kiernan as regional manager, northeastern area, with offices at Rahway, N. J.

Dale V. Cropsey, vice president-sales director, **Potter & Brumfield Inc.,** Princeton, Ind., subsidiary of American Machine & Foundry Co., assumes the new title of director of marketing.

James W. Charbonnier fills the new post of director of industrial and plant engineering, **Black & Decker Mfg. Co.,** Towson, Md.

Marvin Van Dusen was named to the new post of sales co-ordinator, Powrworker section, industrial truck division, **Clark Equipment Co.,** Battle Creek, Mich.

A. G. Herrick was made industrial sales manager, **Martin - Decker Corp.,** Long Beach, Calif. He succeeds **Roy I. Boydston,** now product engineer, in charge of product development.

At the Pittsburgh district office of **Allis-Chalmers Mfg. Co.'s** Industries Group, **John H. Baisley** was made manager, metals industry sales; **E. E. Ellis,** manager, general industrial sales; **L. H. Walke,** manager, utility sales.

Arthur W. Smith was made general manager in charge of manufacturing and engineering at **Hohl Machine & Conveyor Co. Inc.,** Buffalo.

Frederick A. Brawner was made master mechanic, **Penberthy Mfg. Co.,** Detroit. He succeeds **G. A. Kendall.**

Perfex Corp., Milwaukee, promoted **Walter J. Beyer** to the new post of manager of engineering. He is succeeded as chief engineer by **Robert G. Jensen.**

Carroll C. Parker was made grinding wheel sales manager, mechanical goods division, **United States Rubber Co.** Succeeding **J. A. Fairfield,** retired, he has headquarters at the Ft. Wayne, Ind., plant. **William J. Reddington** was made St. Louis district sales manager for the division, succeeding **Hugh Reynolds,** retired.

H. G. Hilton was elected chairman, **Steel Co. of Canada,** Hamilton, Ont., succeeding **Ross H. McMaster,** retired. Mr. Hilton, president since 1945, continues as chief executive officer. **V. W. Scully,** vice president and general manager, was elected president.

John J. Astroth was elected president of **Key Chemical Milling Co.,** San Diego, Calif.

Colonial Supply Co., Pittsburgh, elected **T. H. Gebhart** executive vice president; **J. C. Mock,** vice president and sales manager; **C. O. Perts,** vice president and chief engineer; **J. H. Ritchie,** vice president.

M. S. Rosenberger was made assistant chief engineer, **Chevrolet Motor Division,** General Motors Corp., Detroit. He replaces **Russell F. Sanders,** now director of engineering and sales, Rochester Products Division.

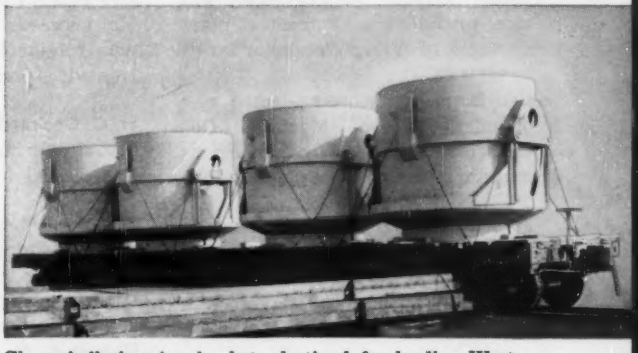
Roy M. Skeirik was made manager of the production department's mechanical assembly section at Elec-

STEEL PLATE *Fabricating Facts!*

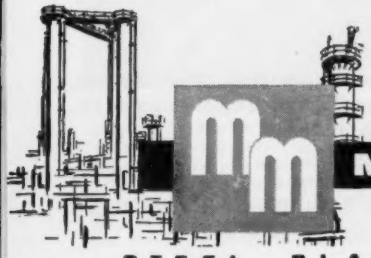
McGREGOR-MICHIGAN Brochure Describes Diversified Facilities and Production

In this compact 12-page brochure you'll find valuable information on McGregor-Michigan's equipment and typical steel plate fabrications. It shows scenes in our new 30,000 square foot Heavy Fabricating Plant and our original Rivard plant. It describes some of our new equipment including a 650 ton press brake and our 600 ton "Bulldozer" horizontal forming press capable of forming heavy beams or solid sections. In addition you'll find clear illustrations of steel plate fabrications for the primary metal producers—ladles, buckets, hooks, doors, water-cooled roof rings and others—and equally interesting chemical and petroleum processing equipment—ASME Code vessels, autoclaves, heat exchangers, kettles and tanks. Many of these assemblies run to 50 tons and over, in mild, stainless and alloy steels. Typical miscellaneous industrial fabrications shown are engine beds, bases for machines, jigs and fixtures, heavy-wall cylinders, foundry cupola shells, furnace casings, a self-propelled sewer tunnel shield and a heavy boom for a power shovel. The brochure also describes our plate warehousing and specialized surface treating services.

We would appreciate your including this informative booklet in your file of fabricating sources. Please send for a copy and the name of our representative nearest you or call direct for prompt service on any steel plate fabricating problem.



Clam shell charging buckets destined for leading West Virginia aluminum plant.



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WALTHER H. FELDMANN
Worthington president

CHARLES W. DARBY
Crucible Steel div. post

NILS H. LOU
joins Reynolds Metals

W. F. NEWBERY
Detrex vice president

HOWARD W. MERRILL
Martin Co. promotion

troData Division of **Burroughs Corp.**, Pasadena, Calif.

Nils H. Lou joined **Reynolds Metals Co.** as manager of manufacturing for its parts division at Louisville. He was works manager, Republic Aviation Corp., which he joined in 1952. He previously was vice president and tractor plant manager at Harry Ferguson Inc.

Leo B. Kelly Jr. was elected vice president, **Penn Machine Co.**, Johnstown, Pa. He continues as secretary-treasurer.

John Cattanach Jr. was made sales manager of tubular products and cold finished steel bars at the Buffalo plant of **Joseph T. Ryerson & Son Inc.**

H. Charles Yaeger was made manager of the new Jackson, Miss., plant of **Vickers Inc.**

Dr. Edwin Ruh was named assistant director of research for **Harbison-Walker Refractories Co.**, Pittsburgh.

W. F. Newbery was elected vice president-industrial sales, **Detrex Chemical Industries Inc.**, Detroit.

Howard W. Merrill, director of operations at the Baltimore division of **Glenn L. Martin Co.**, was named a vice president of the company and general manager at Baltimore. He succeeds **William B. Bergen**, who retains his position as executive vice president.

H. C. Deckard was made director of manufacturing, **Wickfield Aviation Inc.**, Dallas.

Clearing Machine Corp., division of U.S. Industries Inc., promoted **Ted Goeller** to assistant sales manager in charge of all dealer contacts. He has headquarters at the Hamilton, O., plant.

Eugene W. Metcalf was named vice president-sales, **Colling Machinery Corp.**, Los Angeles.

David M. Davis was named assistant district sales manager, Dayton, O., for **Superior Steel Corp.**

Gifford Kittredge was made manager, commercial division, **Lamson Corp.**, Syracuse, N. Y. He was New York regional manager.

Walther H. Feldmann was elected president of **Worthington Corp.**, Harrison, N. J., to succeed **Edwin J. Schwanhausser**, now vice chairman. Mr. Feldmann was executive vice president. **Hobart C. Ramsey** continues as chairman and chief executive officer.

Charles W. Darby fills the new post of production manager for **Crucible Steel Co. of America's** spring division at Pittsburgh. He is responsible for production, quality control and maintenance.

L. C. Milliken, treasurer, was elected president, **Quaker State Metals Co.**, Lancaster, Pa. Formerly a vice president of William Iselin & Co., New York bankers, he has been president of Karl Lieberknecht Inc., machinery manufacturer. **A. H. Charlton**, vice president-general manager, was named executive vice president.

OBITUARIES...

Wendell E. Whipp, 73, chairman, **Monarch Machine Tool Co.**, Sidney, O., died Apr. 27.

Frank Weir, 57, assistant general sales manager, **Harbison-Walker Refractories Co.**, Pittsburgh, died Apr. 23.

Frank W. Milbourn Sr., 76, president, **Coe Mfg. Co.**, Painesville, O. died Apr. 20.

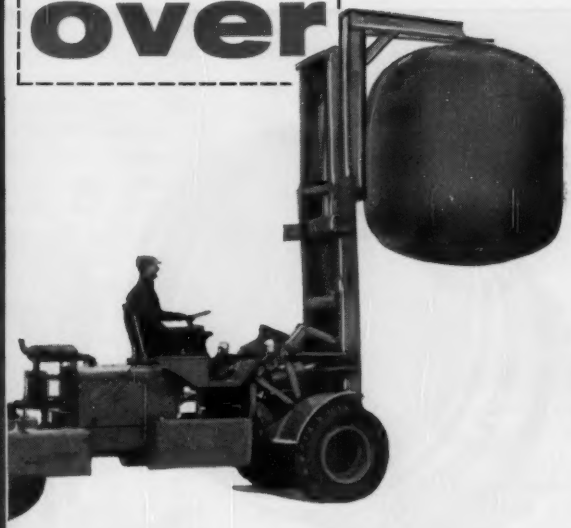
Francis R. Thompson, engineer in charge of the electrical engineering department, **Mesta Machine Co.**, Pittsburgh, died Apr. 16.

Howard J. Palmer, 62, purchasing agent, **International Minerals & Chemicals Corp.**, Niagara Falls, N. Y., died Apr. 18.

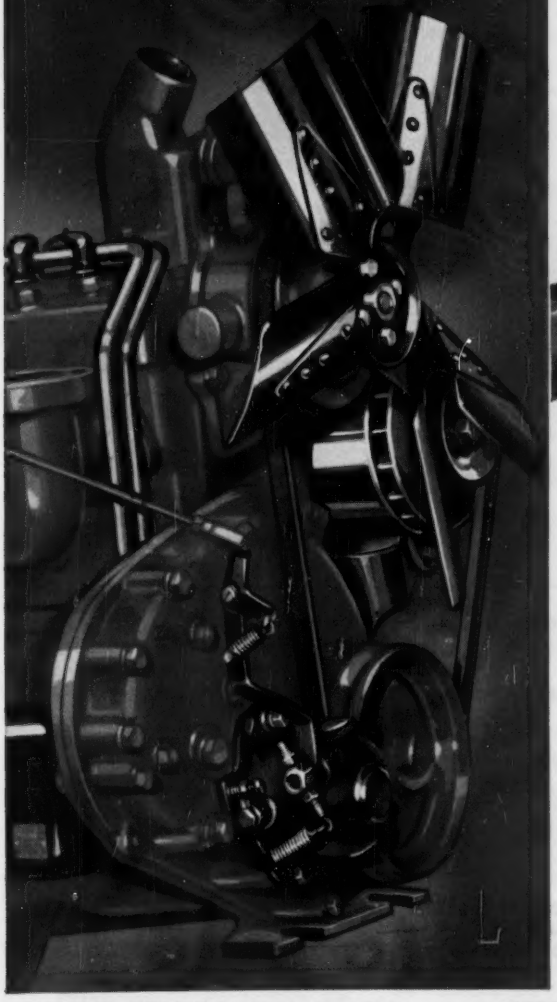
Harry A. Severson, 79, chairman, **Barber-Colman Co.**, Rockford, Ill., died Apr. 18.

Julius Gershon, 57, founder of **Atlas Steel Products Co.**, Jersey City, N. J., died Apr. 21.

up and over



The Payoff Power *is Chrysler*



Huge, collapsible rubber containers for economically storing and shipping flowable bulk are *filled, transported, loaded* with speed and ease by one man and a 12-ton Silent Hoist *Lift-O-Krane.* This unique fork truck-crane combination is powered by Chrysler for maximum-load performance with minimum maintenance . . . equipped with Chrysler gyrol Fluid coupling for smoother starting and acceleration, longer engine life.

CHRYSLER INDUSTRIAL 33, in-line 6 Engine (265 cu. in. displacement) powers the Silent Hoist Lift-O-Krane—and many other makes of equipment in the construction and materials handling fields. There are five Chrysler in-line 6s, two V-8s—ranging from 230 to 354 cu. inch displacement. For detailed information about Chrysler Industrial Power, write: Dept. U5, Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.

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P-413 CONTAINER LINING

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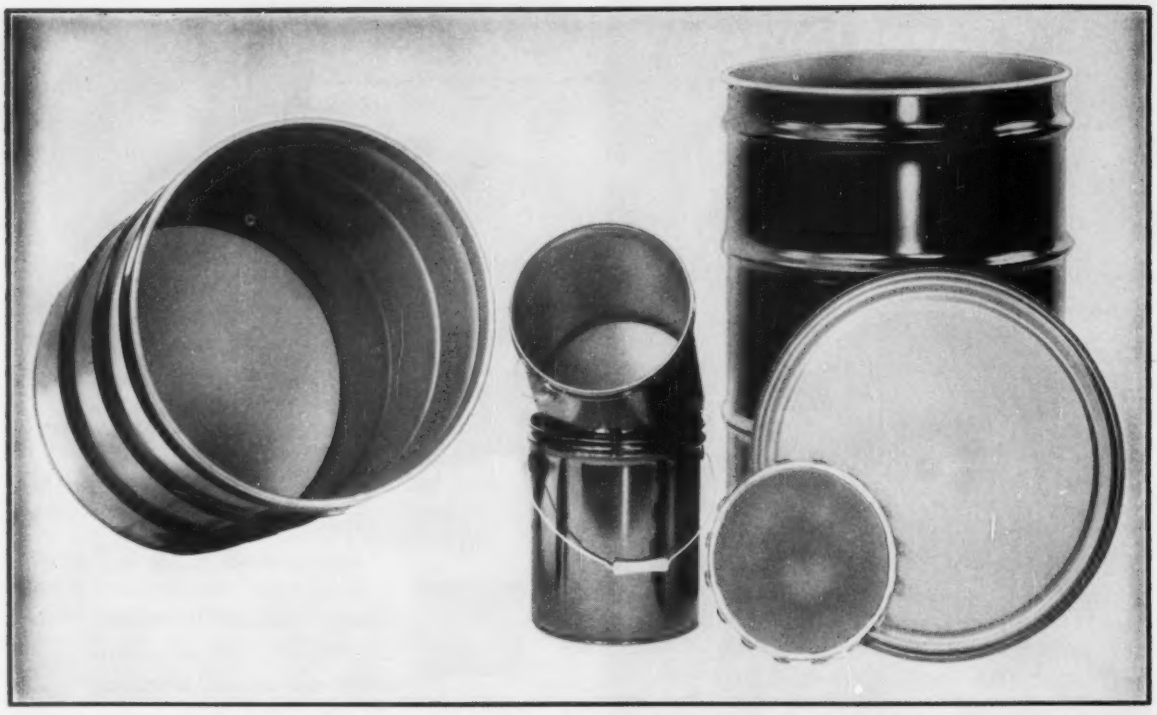

HERESITE baked phenolic linings provide maximum protection against corrosion or product contamination.

Millions of steel shipping containers transport valuable products safely because they are HERESITE lined.

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Outstanding adhesion qualities on plain degreased metal—no etching—no sandblasting necessary.

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Applies Automation

Alco Products increases output of hot-wound springs by using instrument control

ALCO PRODUCTS INC. has doubled production of freight car springs at its Chicago Heights, Ill., plant by using automation techniques.

Instrument control and automatic material handling are largely responsible for increasing annual steel consumption capacity from 12,000 to 20,000 tons.

Wherever possible, conveyor production is used—from the initial bar-end tapering operation through heating, coiling and cooling, oil quenching, drawing, testing and final inspection.

Integration of more than a dozen process steps into an efficient, controlled operation is expected to result in lower costs, improved quality control and accelerated output.

Known for many years as American Locomotive Co., Alco produces springs for railroad freight and passenger car trucks, draft gears, diesel locomotives, farm equipment, industrial machinery and ore-crushing equipment.

Tull To Build Warehouse

A contract for the construction of a $350,000 steel warehouse in Birmingham has been announced by J. W. Tull Metal & Supply Co. Inc., Atlanta. Estimated cost of the 48,000 sq-ft building and equipment: $2 million. H. F. Homer will have charge of the new facility.

NRC Metals Corp. Renamed

Columbia-National Corp. is the new name of NRC Metals Corp., Cambridge, Mass. The company has been acquired by Columbia-Southern Chemical Corp., a subsidiary of Pittsburgh Plate Glass Co., Pittsburgh. Production facilities are in Santa Rosa county, Florida. Officers of Columbia-National are: E. T. Asplundh, chairman; R. S. Morse, president; J. A. Neubauer, executive vice president; Gordon Kiddoo, vice president and general manager; L. S. Williams, treasurer and controller; R. M. Nichols, clerk and secretary.

Columbia-National soon will complete construction of a $7.5-million plant for the production of zirconium in Milton, Fla. A large part of the plant's initial production will be delivered to the Atomic Energy Commission for use in the Navy's nuclear powered submarine and surface ship propulsion program.

Foundry Installs Betatron

Electric Steel Foundry Co., Portland, Oreg., has purchased a 22-million-volt Betatron from Allis-Chalmers Mfg. Co., Milwaukee. It will complement the company's 220,000-volt x-ray and cobalt-60 radiographic facilities. Officials say the Betatron will be the first industrial unit with ceiling mounted, telescoping-tube suspension which will rotate vertically and horizontally. It will provide 4 ft of vertical travel and 20 ft of horizontal dolly travel. The company will use it to inspect thick castings for atomic energy, guided missile and other applications.

2-Ton Titanium Ingot

Comparison of titanium ingots made by Republic Steel Corp., Canton, O., shows progress made in production technology since 1950. Charles Fiala, assistant superintendent of titanium operations, examines ingots weighing 30 and 4500 lb. Now under construction are furnaces that will produce 8500-lb ingots

Builds $3-Million Laboratory

Utica Drop Forge & Tool Division of Kelsey-Hayes Wheel Co. has begun excavation for a $3-million vacuum metals laboratory at Utica, N. Y.

Aluminum Producer Adds Plant

Aluminum Co. of Canada will build an aluminum wire and cable plant at Richmond, B. C., and enlarge its aluminum extrusion plant there.

Warehouses Strip in Chicago

Penn Precision Products Inc., Reading, Pa., opened a warehouse in Chicago. It will carry stocks of beryllium copper, phosphor bronze and nickel silver strip.

Springmaker Changes Name

Seaboard Coil Spring Division, Associated Spring Corp., Gardena, Calif., is changing its name to Seaboard Pacific Division, effective June 1. It will supply a wide range of precision mechanical springs and spring steel products, as well as automotive clutch springs made by the corporation's Raymond Division.

Koppers Gets Chilean Contract

Koppers Co. Inc., Pittsburgh, has been awarded a contract to design, purchase certain equipment and supervise erection of an open-hearth furnace for Compania de Acero del Pacifico, Santiago, Chile. The furnace will have a capacity of 220 net tons and will be the fourth of the firm's Huachipato Works. It is a part of a $26-million improvement and expansion program which will extend over the next two years.

Westinghouse Builds in West

Construction is under way on a plant for Westinghouse Electric Corp. at Compton, Calif. The building will have 80,000 sq ft of plant area and 8000 sq ft of office space. It will replace the company's facility in Huntington Park, Calif. In addition to the plant's repair activity, facilities are being

provided for the manufacture of electrical apparatus, such as switchgear, controls and panelboards.

Opens Atlanta Sales Office

Babcock & Wilcox Co., Beaver Falls, Pa., opened a district sales office for its Tubular Products Division at 830 W. Peachtree N.W., Atlanta. William Lehr is manager of the new office.

Can-Car Changes Name

Canadian Car & Foundry Co. Ltd. changed its name to Canadian Car Co. Ltd. Last year it established a new company, Canadian Steel Foundries Ltd., which formerly was the steel foundry division of the parent firm.

Will Fabricate Aluminum

Spartanics Inc., a newly organized firm in Sparta, Wis., will build a 6000 sq-ft factory for the fabrication of aluminum.

Steel Fabricator Builds

Gouverneur Iron Works, Gouverneur, N. Y., is erecting a plant on Factory street, that city. It will house all structural steel and ornamental iron fabrication processes.

Topp Mfg. Opens New Plant

Topp Mfg. Co., a division of Topp Industries Inc., Beverly Hills, Calif., opened plant No. 4 at Anza and 104th streets, Los Angeles.

Champion Hardware Sells Out

Champion Hardware Co., Geneva, O., will close its plant at the end of June. Raw materials, dies and equipment have been sold to Safe Padlock Hardware Co., Lancaster, Pa.

N. Y. Skyscraper Uses Bolts

Steelwork on the 38-story office building of Tishman Realty & Construction Co. Inc., 666 Fifth Ave., New York, has been completed. High tensile strength bolts and nuts were used to join all members of the 1,050,000 sq-ft structure.

Builds Buffalo Warehouse

Peninsular Steel Co. is erecting a 14,000 sq-ft building at Tonawanda, N. Y., to warehouse tool steels, cold-rolled bars and plates. Completion of the $250,000 facility will triple the company's warehouse space in Buffalo.

Kerns Pacific Opens Plant

Kerns Pacific Corp., a wholly owned subsidiary of L. R. Kerns Co., Chicago, opened its new plant in Orange, Calif. Industrial metal processing compounds and specialized chemical products will be made. The plant's capacity is rated at 20 million lb annually. Arnold F. Kluender is vice president in charge of operations and A. L. Spalding is vice president in charge of sales at Kerns Pacific.

Los Angeles Office for Brush

Brush Electronics Co., Cleveland, manufacturer of industrial and research instruments, established a factory branch office at 1960 S. LaCienega Blvd., Los Angeles.

Shifts Power Tool Production

Porter-Cable Machine Co. will shift production of portable power tools to its Marcellus street plant, Syracuse, N. Y., this year.

Thermal Research Adds Branch

Thermal Research & Engineering Corp., Conshohocken, Pa., opened a sales office at 3021 W. 63rd St., Chicago. R. P. Mooney is manager. Thermal makes fired heat equipment and high heat release combustion equipment.

Columbus Plant To Make Heaters

Westinghouse Electric Corp. has shifted production of electric water heaters from Mansfield, O., to Columbus, O. The firm now makes five major appliances at Columbus. The others: Refrigerators, freezers, washer-dryers and dishwashers. The capacity of the plant now is more than 1 million major appliances a year.

CONSOLIDATIONS

Atlantic Research Corp., Alexandria, Va., acquired **U.S. Flare Corp. & Associates** of Pacoima and Saugus, Calif., makers of rocket ignition systems, missile tracking systems, pyrotechnic and high explosive ordnance items.

General Instrument Corp., Elizabeth, N. J., acquired **Radio Receptor Co. Inc.**, Brooklyn, N. Y.

Ritter Co. Inc., Rochester, N. Y., is acquiring **Liebel-Flarsheim Co.**, Cincinnati, maker of medical equipment.

ASSOCIATIONS

American Institute of Steel Construction, New York, presented the J. Lloyd Kimbrough Medal to Dr. David B. Steinman in recognition of his "outstanding contribution to the structural steel industry in the design or construction of structures in steel." Established in 1938, the award has been granted only once before, in 1941, to Commissioner Robert Moses.

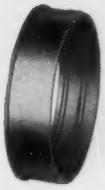
Prefabricated Home Manufacturers' Institute, Washington, elected these officers: President, G. E. Price, National Homes Corp., Lafayette, Ind.; vice president, Robert J. Lytle, Modern Homes Corp., Dearborn, Mich.; secretary-treasurer, H. N. Durston, American Houses Inc., Lumberton, N. C.

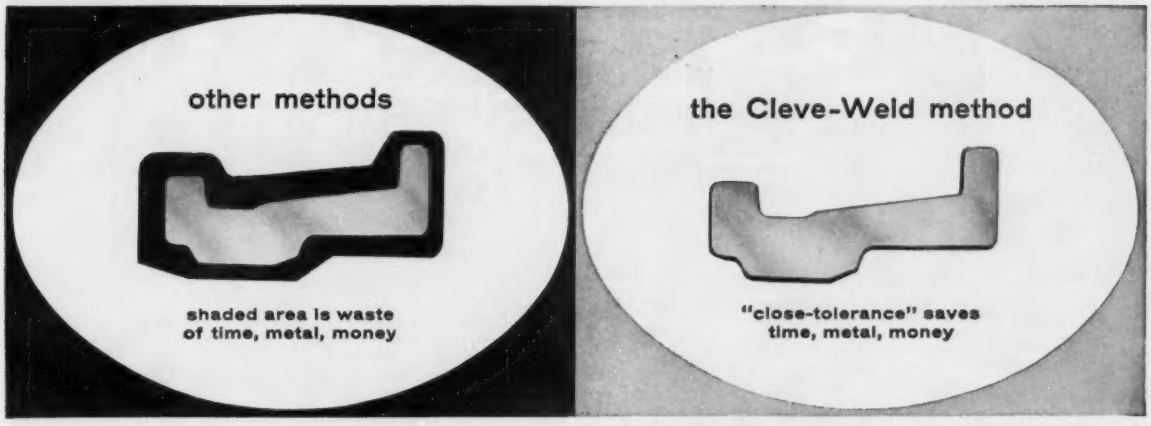
NEW ADDRESSES

Barber-Colman Co. established a subbranch office for its Wheelco Instruments Division at 20 Leland Ave., Columbus 14, O. H. J. Hoffman is manager. Wheelco's Cincinnati branch office has been moved to 8016 Plainfield Rd. New address of the Houston branch is 2712 Danville St.

START CLOSER TO THE FINISHED PRODUCT...

...with Cleve-Weld "close-tolerance" circular welded components!





When you specify bulky cast or forged parts, you pay for excess metal...then pay to shave it away! But every ounce of material on "close-tolerance" Cleve-Weld circular steel parts has a function. A minimum of finish machining gives you a component ready for the assembly line!

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Over 45 years of welding specialization backs the Cleve-Weld Process. In fact, we've designed our own special machinery for roll-and-weld processes. That's why we can produce, in quantity, everything from simple bands to jet rings and complex shapes and cross sections. And we're right at home with practically any metal under the sun...from carbon steel to the latest aircraft alloys!

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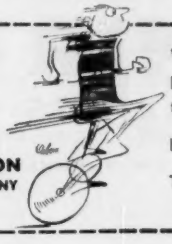

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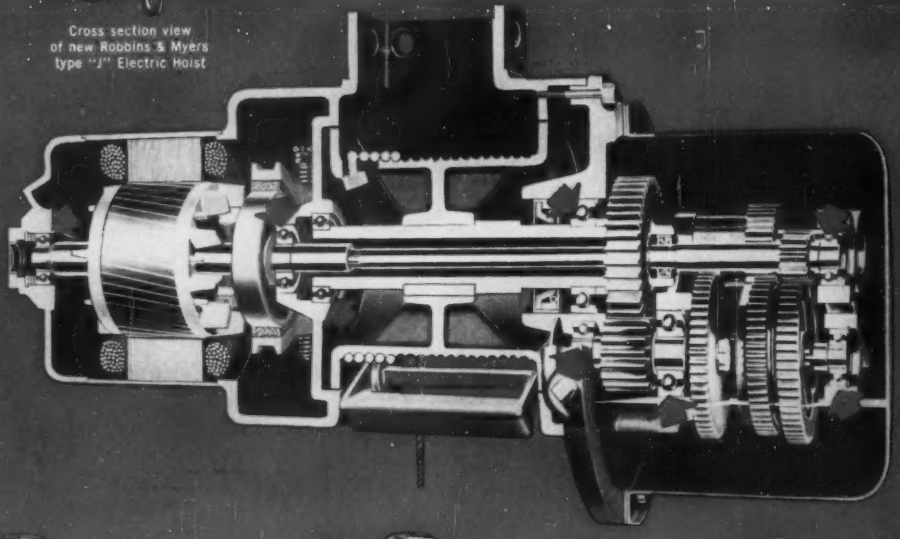
9 PROVEN POINTS OF QUALITY ENGINEERING IN A LOW-COST HOIST



Cross section view of new Robbins & Myers type "J" Electric Hoist

The Fafnir 9100K Series ball bearing is designed basically for applications where housing diameters are restricted and maintenance of relatively large shaft diameters is essential. Available with seals or shields.

The Fafnir 200K Series ball bearing is well suited for applications requiring light to moderate loads combined with relatively high speeds. Available with seals, shields, and snap rings in various degrees of precision and retainer construction.

WHEN the design engineers of Robbins & Myers were asked to develop a low-cost electric hoist that would measure up to R & M standards of quality, they made good use of Fafnir Ball Bearings. They specified them to insure precise alignment of parts, conservation of power, minimum maintenance, reserve capacity for long life. In three critical locations they specified Fafnir Plya-Seal bearings — the bearings that provide superior retention of lubricant and positive protection against contaminants. With these and other construction features, they came up with the design of the new Robbins & Myers low-cost, "J" hoist, *quality engineered throughout.*

Fafnir is a supplier of ball bearings for leading industrial hoists, hoist trucks, and hundreds of other industrial machines and equipment where ball bearing advantages improve performance and prolong service life. In case after case, the choice of Fafnir Ball Bearings is influenced by the Fafnir "attitude and aptitude"—a way of looking at bearing problems from the designer's viewpoint and the ability to supply the right ball bearing to fit the need. Perhaps these attributes can help you solve a bearing problem. The Fafnir Bearing Company, New Britain, Conn.

FAFNIR

BALL BEARINGS

MOST COMPLETE LINE IN AMERICA

Technical Outlook

FAST GAGE— Sheets of tin plate are gaged on the fly at Youngstown Sheet & Tube Co.'s Indiana Harbor, Ind., works. An x-ray classifier checks thickness at speeds up to 100 sheets a minute and rejects those which are off gage. It's made by Industrial Gages Corp., West Englewood, N. J.

BIG STRETCH— The Reynolds Metals Co. plant at McCook, Ill., has a machine to stretch aluminum plates which are 6 in. thick, 12 ft wide and 90 ft long. Pulling force is 16 million lb. Stretching relieves internal stresses set up in rolling and heat treating. The product: Wing sections for airplanes.

TITANIUM MILLING— In efforts to solve problems in milling titanium and other hard-to-machine metals, engineers at DoAll Co., Des Plaines, Ill., have come up with a grooved cutter that produces small ridges in the path of each tooth. The grooves are ground across the flutes. Ridges are designed to apply extra pressure to the following tooth, forcing it to take a uniform cut.

CYCLOSTEEL— A lot of speculation has been published about this direct reduction process being developed by the British Iron & Steel Research Association. The facts seem to be these:

Cyclosteel is a combination of three ideas: 1. A furnace burning powdered coal in oxygen: Preheated, partially reduced and finely divided iron ore will be introduced into the furnace with the coal. 2. A slagging cyclone: The combustion mixture will enter a circular chamber tangentially. It will whirl around the walls, throwing out heavy solids (in this case slag and iron) by centrifugal force. 3. Controlled reaction: Theoretically, by varying the partial pressure of oxygen entering the furnace, reduction and oxidation can be controlled to produce a liquid steel of predetermined analysis.

The first two ideas have been demonstrated. BISRA is now putting them together with idea No. 3. If a production unit is able to produce steel directly, it will still have to prove its worth economically. That's where most direct reduction schemes fall flat.

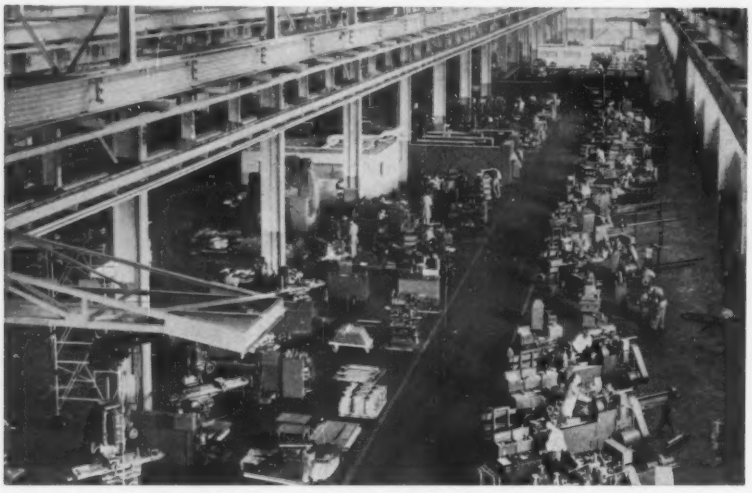
WEARS BETTER— Cast iron founders may soon be adding small amounts of tin to improve the wear resistance of their products, say researchers at Battelle Memorial Institute, Columbus, O. Tin stabilizes the pearlite without promoting the formation of massive cementite. Machinability is unaffected. The small quantities of tin also won't change other mechanical properties.

LONGER COOLANT LIFE— Many shops are extending the life of soluble oil emulsions by adding a preservative, such as Dowicide A (Dow sodium orthophenylphenate). A concentration of 0.10 per cent preservative normally is sufficient.

FINISH CONTROL— General Motors' research staff, Detroit, has developed a quality control instrument that measures a paint film, electroplate or metal overlay as thin as 0.0001 in. Called the Laminagage, it's already in service in two GM divisions. Typical jobs: Measuring the thickness of paint on aluminum, gaging the thickness of copper and nickel electroplates on steel and babbitt bearing overlay on bronze. It can be plugged into a 110-volt plant outlet. Its operation does not require special training.

Metalworking Outlook—p. 45 *Market Outlook—p. 125*

Single-story office building at left backs up to the 700-ft long plant. The shipping area is at the far end



Material flows down this light machining line through the machines in the foreground to stockroom, assembly and shipping at the far end

Automation Builder Expands

Anticipating a growing market for special machine tools, Cross builds a plant that uses in-line production flow. Univac is used in programming production

THE NEW Cross Co. plant is designed for simulated in-line production. Material comes in at one end and moves through parallel light, medium and heavy machining bays into inspection and on to assembly.

The $6-million factory and office building on Detroit's north side completes the first phase of the automation builder's long range expansion program. Milton O. Cross Jr., president, says: "We now have capacity for an annual sales volume of $15 million and floor space to eventually increase our capacity to a $25-million volume."

Short Cuts—To get rid of workpiece back tracking, Cross planners duplicated some machines in several bays. Horizontal boring mills are in both the medium and heavy lines. Radial drills are in all three lines.

An inspection zone spans the middle of the plant. All parts go through the area before they are moved on into stock storage. In the stockroom, parts are grouped by job numbers—are pulled out in lots when assemblers need them.

Assembly — Three assembly areas, at the ends of the 700-ft long bays, provide enough space to assemble as many as 15 transfer machines at one time. Two wood block assembly floors will handle machines up to 300 ft long. The third has a smooth cement floor and a central reservoir for assembling and testing transfer machines that use coolants.

Adjacent to the heavy machining line on the west side of the building are additional quarters which house the casting cleaning room, heat treating, maintenance and liaison engineering.

Office—The single-story office building is a square with a row of executive offices across the front and a parallel row of manufacturing offices across the rear adjacent to the factory.

Between these rows are nine modular office units, 60 x 80 ft, which house the engineering, sales, purchasing, accounting, data processing and reproduction departments. Engineering, sales, purchasing and accounting departments all are carpeted to reduce noise levels.

Brain—The data processing department uses a Remington-Rand Univac electronic "brain" to calculate and record the payroll, distribute direct and indirect labor, provide weekly reports on past due machine work and individual machine loads, provide shortage reports for assembly and progress reports on individual orders.

As it's used on production programming, Mr. Cross says the Univac "keeps work flowing with fewer interruptions." He feels this will help lessen lead time necessary to fill orders.

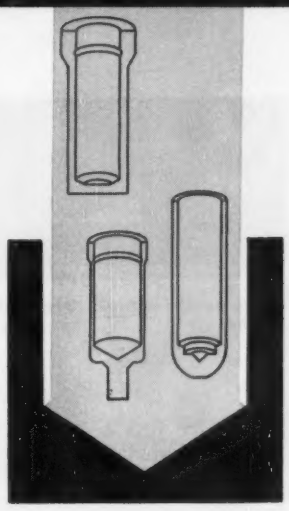
Plans already are under way to use the machine to supply market data and weekly sales reports on active inquiries. Eventually, it may also help solve routine but complicated design problems.

Competition — The engineering offices are organized into sections to develop intercompany competition. Engineering managers oversee each of the two sections, operating them as separate businesses. The two sections are competitive on design results.

Capacity of the two independent sections is 250,000 engineering man-hours a year. Office modules are available for two more sections of the same size.

With an eye to the future, Cross management has set up a school, housed in the office building, that's turning out 16 qualified draftsmen a year. Trainees work on engineering projects under close supervision until they are qualified.

The process turns out draftfree, close tolerance parts in a hurry. They require minimum machining. New development: An automatic slug casting machine



production ideas
NO. 10 OF A SERIES

Cutting Costs with Impact Extrusion

THE PISTON tube orifice supports in the photo below were impact extruded. They are parts for aircraft landing gear made at Harvey Aluminum, Torrance, Calif.

The large extrusion in the center is 32 in. long and 5.200 in. in diameter. The flange on the open end is 8 in. in diameter. The 7075-T6 aluminum alloy part is extruded with tolerances of ±0.010 in., a surface finish of 100 rms and concentricity of 0.010 in.

Compared with the same part made by other methods, the impact extrusion has higher physical properties, weighs less, requires less machining and can be made at lower cost.

Impact—The support is not a typical part because it's so large, but the advantages of strength and cost are typical of a process that's being used to fabricate aircraft and missile parts, auto components and consumer products.

Impact extrusion has been called cold forging and cold extrusion. Actually, it's a combination of the two. The walls of the tubular part are cold extruded between the punch and the die. The closed end of the tube is cold forged between the bottom of the punch and the bottom of the die.

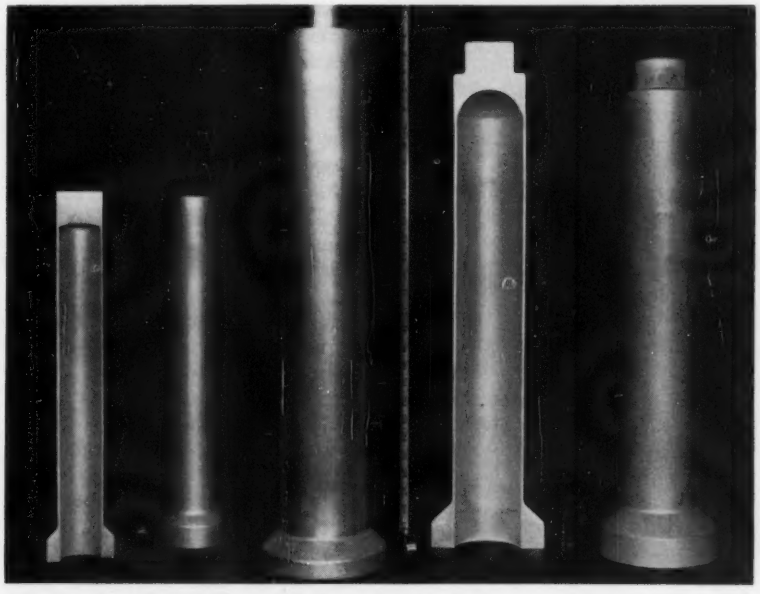
Properties — This cold working gives the impact extrusion all the desirable properties inherent in a forged structure. When standard heat treatments are used on suitable compositions, properties are as good as those of aircraft quality hot forgings.

For many applications, heat treatment is not required since strength and toughness in the as-extruded temper are excellent.

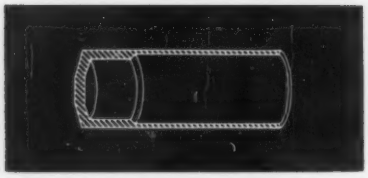
How It's Done—There are two types of impact extrusion—reverse and forward. In reverse, the metal flows upward around the punch, opposite to the direction of the punch. In forward, the metal flows ahead of the punch, through an opening in the die and in the same direction as the punch.

The simple, flat-bottom shell is a conventional reverse extrusion. The more complex shapes usually are a combination of the two.

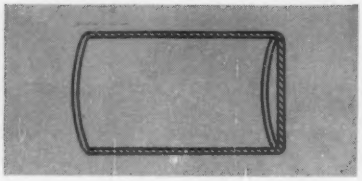
Presses—Originally, impact extrusion was done on mechanical presses and was limited largely to the soft pure metals, such as tin, lead, aluminum and, to a lesser ex-



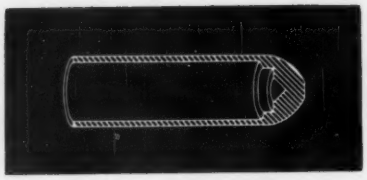
Piston tube orifice supports impact extruded by Harvey Aluminum



A step can be designed into the inside of the shell

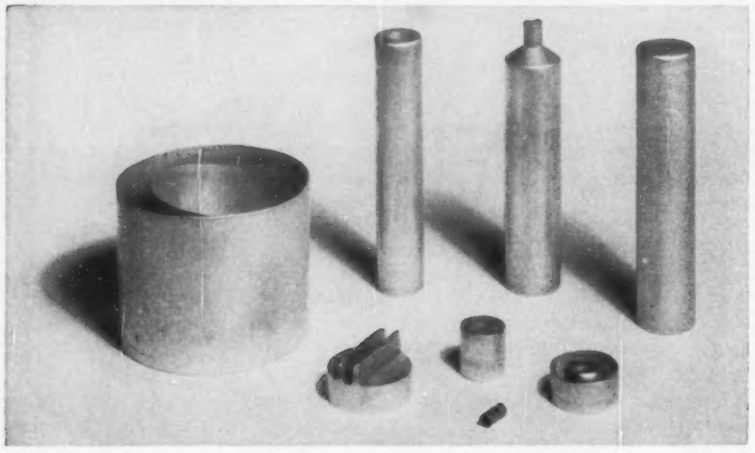


Standard-flat-bottom shell. Standard domed-end shells also are extruded



Shells can have deep domed or tapered ends to meet specific requirements

These are just a few of the shapes that can be impact extruded. Endless variations of the standard, flat-bottom shell are possible



Impacts by Sun Tube Corp. Left to right: Magnetic amplifier corebox, inner cylinder to fit start pilot for diesel engine, servomotor housing, start pilot for diesel engine; bottom row, left to right, instrument cap, two smaller sizes of magnetic amplifier corebox and fine silver miniature capacitor case

tent, zinc, copper and magnesium.

Now, the harder alloys are being formed in more complex shapes on relatively slow acting, high tonnage hydraulic presses.

Metals—The 1100 (2S) and 3003 (3S) alloys make up most of the aluminum impacts being formed, but the stronger, heat treatable alloys such as 7075 and 2014 are being cold extruded in lengths up to 60 in., diameters up to 8 in. and with both internal and external discontinuous configurations as an integral part of the shell.

Aluminum missile tubes for the Navy are in quantity production.

Clad Metals—Aluminum Co. of America is impact extruding aluminum parts with thin surface cladding that provides cathodic corrosion protection, facilitates finishing or makes joining easier.

This makes aluminum impacts feasible in applications such as water filters, small water tanks, steam traps, electrical cases, fittings for home hot water heaters and process industry operations where corrosive solutions or atmospheres are severe.

Finishes—It is possible to clad high-strength parts with an alternate aluminum alloy for all types of finishing processes. Decorative finishes can be applied to Seltzer bottles, coffee makers and aerosol cans.

In another application, a thin layer of brazing alloy, on either the inside or outside of the extrusion, permits ease of assembly and joining of such items as appliance parts, electronic components and aircraft assemblies.

Other Metals—Fine silver is being impact extruded. Sun Tube Corp., Hillside, N. J., has made a miniature capacitor for amplifiers in underwater cables. The need here was for a high grade product with long life to use in hard-to-get-at spots.

Development work for the AEC on the cold extrusion of zirconium, molybdenum and other special reactor metals is under way. A small copper shell for an atomic device has been impact extruded.

Warm Extrusion — Magnesium, like the stronger aluminum alloys, is not extruded strictly cold (room temperature). Most of the work is done at 400°F. The bulk of magnesium extrusions go into pyrotechnics and batteries.

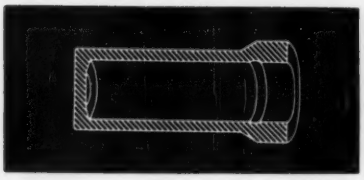
The cheapest way to form slugs for impact extruding is by blanking them from strip. This works well with the softer metals and for the thinner slugs. For larger extrusions, where thick slugs are needed, they are sawed from bars. Magnesium slugs can't be blanked; they must be sawed.

Slug Caster—A recent development, an automatic slug casting machine, promises improved economies and quality. Called Comocast (cold mold casting), it is built by Stroman Furnace & Engineering Co., a division of Peterson Oven Co., Franklin Park, Ill.

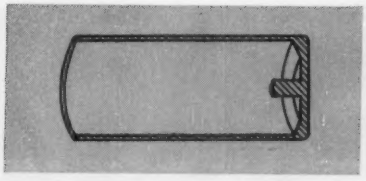
Uniformity of slug size can be held to 0.001 in. for each inch of diameter, and 0.010 in. per inch of depth. Maximum weight variation of slugs cast in a multiple cavity mold can be held within 0.5 per cent.

Mold — The machine produces finished slugs without gates and risers, ready for extruding. It uses a water-cooled mold with cavities machined to the shape of the slugs to be cast. The number of cavities in a mold varies with the size of the slugs.

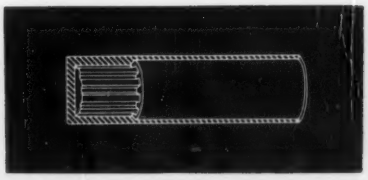
Operating with the mold is a mold pan. Both pan and mold



Wall thickness can be increased at the open end of the shell



Internal bosses can be produced as an integral part of the closed end



Inside ribs can be stopped off near the closed end

When To Design for Impact Extrusion

R. A. Quadt, director of research and development, Hunter Douglas Aluminum Corp., Riverside, Calif., lists these criteria for impact extruded parts:

1. When the part is hollow with one end closed or partly closed, especially when the part is longer than two or three times its diameter.

Screw machine production becomes noncompetitive when the part has internal or external ribs, splines or flutes, and when there are special cavities on the inside or outside of the closed end. Deep drawing becomes noncompetitive when the length is much greater than twice the diameter, especially when the thickness of the bottom must be greater than the side walls.

2. When zero draft on the walls is required.

On many long, tubular shapes, a diecasting would be adequate and competitive except that long, tapered cores necessitate draft on the walls which must be machined to a uniform diameter.

3. When a pressure-tight vessel is required.

There have been cases where lower cost pressure diecastings have been replaced by impact extrusions because of the lack of structural soundness under the chill cast skin.

4. When strength and toughness are required.

Impact extruded products attain the properties inherent in a forged structure. When standard heat treatments are used on suitable alloys, properties are as good as aircraft quality hot forgings. For many applications, heat treatment is not required since strength and toughness in the as-extruded temper are excellent.

5. When assemblies can be replaced by a one-piece design.

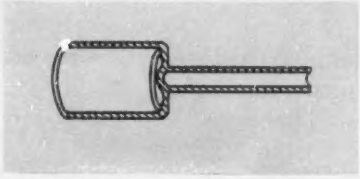
Advantages are lower over-all costs, greater strength, elimination of assembly problems, reduced weight, increased control of quality and elimination of complex inspection procedures.

6. When design can eliminate machining operations.

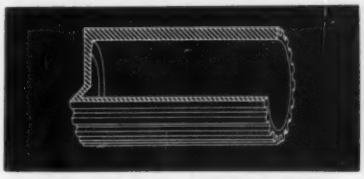
Extrusion diameters can be held to 0.005 in. Walls can be held to screw machine tolerances. On most parts, machining can be limited to cutting to length, drilling and tapping. Where considerable metal must be removed in screw machine operations, substantial economies are possible by eliminating the operation. In many bar or tubular shapes, a number of concentric diameters may permit striking cost reduction because of the reduced amount of metal required to produce an impact extrusion.

7. When quantities are high.

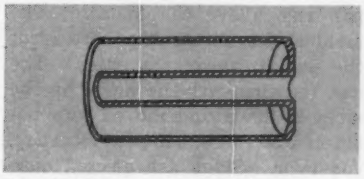
In terms of quantity alone, the feasible range is 10,000 to 1 million parts per month. Other factors may favor limited production. Although 1000 small parts per month probably won't pay, the same number of large, expensive ones will. As few as 30 to 100 may be justified by requirements involving strength, tolerances, machinability and the elimination of assembly problems.



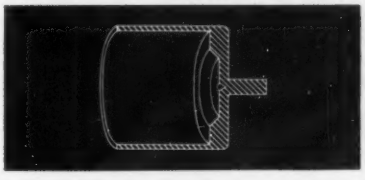
A one-piece, cupped-end tube is stronger than an assembly



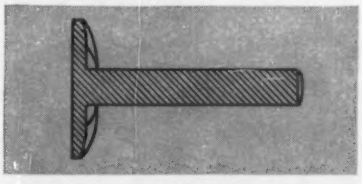
Outside longitudinal ribs can be spaced equally or grouped in symmetrical patterns



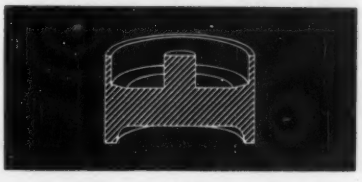
Extruded shell with integral center tube simplifies manufacturing problems and lowers costs



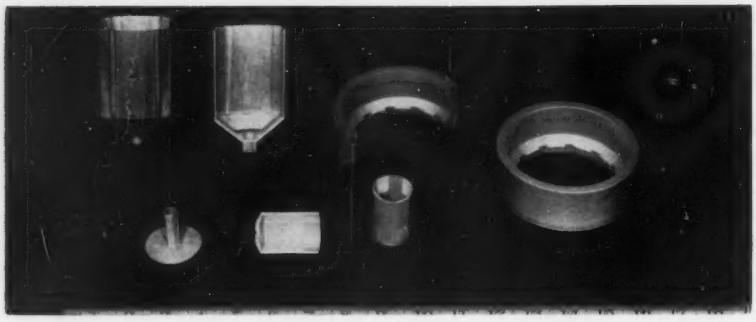
Outside bosses can be any size up to the diameter of the shell



Parts that exceed limits of upsetting operations can be impact extruded



Thin sections can be combined with heavy sections to reduce machining time



More Harvey Aluminum impacts. Upper left: Housing for electric motor on aircraft fuel pump. Lower left: Extruded nut shell fastener replaces steel part made in 12 drawing operations. Top right: Turbopropeller spinner nose. Lower center: Electronic tube shield with internal splines

enter the molten metal in the holding furnace together. In the bottom of the pan are gates (one for each cavity) through which metal enters the mold by gravity. Air escapes through a series of vents in the upper part of the cavity.

Gates Sheared — After completion of a timed cycle, during which the slug solidifies, the mold and pan rise above the metal. The mold shifts across the bottom of the pan to shear the gates. The pan remains over the metal as the mold is lifted and moved into position over an open pan vibrating conveyor. Slugs are ejected onto the conveyor by mechanical ejection pins and compressed air. From the conveyor, the slugs are discharged into a tote pan or onto a secondary conveyor.

The pan is large enough to accommodate a mold 12 in. square. This means that 21 slugs, 1 in. in diameter and 1 in. long, could be cast in one 30-second cycle. Potential output is 2500 pieces an hour.

Specs—The maximum slug diameter the machine will cast is 8 in. Maximum casting length is 6 in. Minimum casting thickness is $\frac{1}{8}$-in. For thin, large diameter slugs, the diameter should not exceed $2\frac{1}{2}$-times the thickness. On long slugs of small diameter, the length should not exceed $2\frac{1}{2}$-times the diameter.

Molds will last indefinitely. About 10 million slugs have been cast from a 16-cavity mold with no significant wear or deterioration.

In Use—One of the slug casting machines is in use at Impax Inc., Ferguson, Mo. Although the unit is being used to cast only aluminum slugs, the company expects to add magnesium soon, other metals later.

Designers at Detroit have been quietly moving to impact extrusions to lower costs and improve the quality of auto parts. Examples in the current crop of autos include torque reaction shafts and servopistons for transmissions, oil filters, brake pistons, oil reservoirs for power brakes and power window lifts, spark plug covers and baffle tubes for shock absorbers.

Impact extrusions go into such consumer products as vacuum bottles, fire extinguishers, coffee makers, air filters, door check cylinders, flashlights, whipped cream dispensers, cigarette lighters and dictating machines.

Grease Gun — One consumer product that uses an impact extrusion as its major part is a grease gun—the barrel, shoulder and neck are a one-piece impact.

The barrel has a circular interior section and an octagonal outer section with heavy longitudinal fluting. All forming is done on a single stroke of the press. The only additional operation is threading the neck for the coupling.

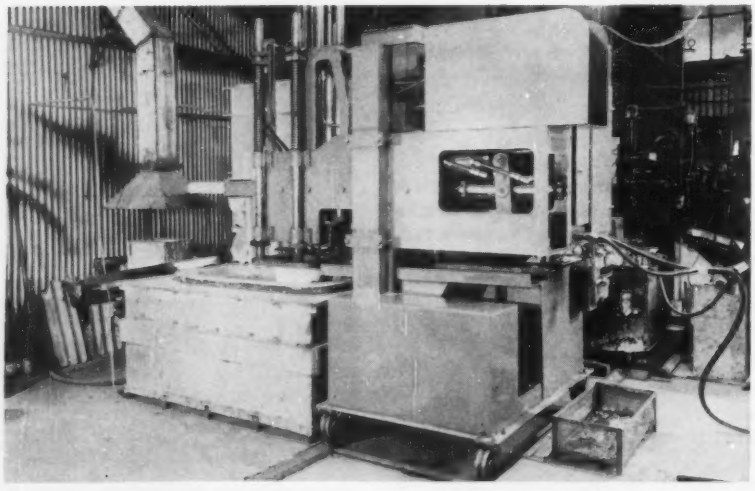
Cost Saver—A magnetic amplifier corebox saves its user up to 90 per cent in costs. This is a special double extrusion—a tube within a tube, joined at the base.

This part was made by machining. Cost was high because of machining time and material that had to be machined off.

Production quantities of this part are being made in 14 sizes. Quality is high; tight tolerances are held; strength is added.

Assembly — An instrument cap was made up of seven parts—four rivets, two stampings and a machined cup. Quality control was difficult because of the number of operations involved. These and handling contributed to high cost. The multiplicity of parts lowered strength because of increased points of stress.

In extruding this part, the prongs or "ribs" were difficult to fill out correctly due to occasional air bubbles, and sharp corners at the bottom of the cup were difficult to attain. Tooling alterations solved both problems and produced a one-piece aluminum extrusion.



View of Comocast machine shows mold pan out of the metal

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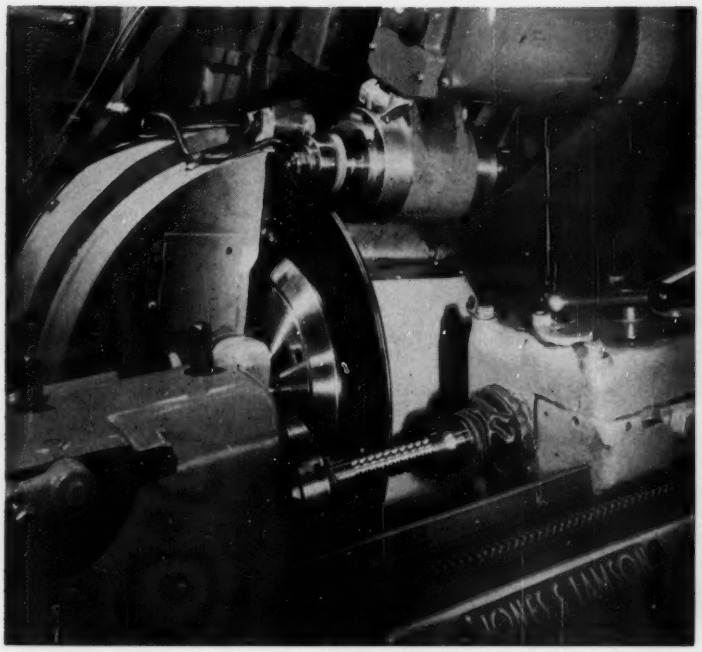
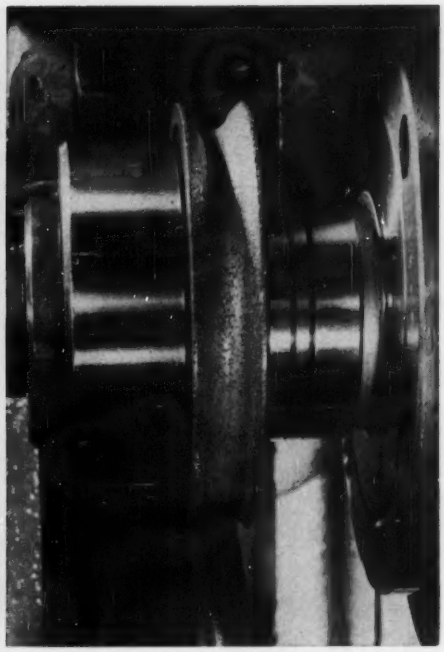




Complete setup of a Jones & Lamson 6 x 36 in. thread grinder with perpetual form control dresser. Diamond impregnated wheel at the top maintains full time control of geometry. This setup for a steering worm is experimental. Normally, the dresser will be behind the wheel. Close-up at right shows diamond particles in the dresser. The workpiece groove, 0.115 in. deep and ¼-in. wide at the crest, takes one pass, uses 20 hp

Wheel Dresser Works Full Time

Filled with diamond particles, this tool is in continuous contact with the grinding wheel. One job has run more than 1½-years without any need for tool attention

"FOR THE first time, we're actually cutting the grinding wheel," says James R. Longwell, consultant, Koebel Diamond Tool Co., Detroit. He's referring to a new wheel dresser which he calls, "a brand new tool for industry—not a substitute."

The object of his enthusiasm is a circular form cutter (the CDP), which is loaded with fine diamond particles suspended in a powder metal body. The cutter is driven. It rotates in the same direction as the grinding wheel and cuts it with the same action that's used to grind, or cut, the workpiece.

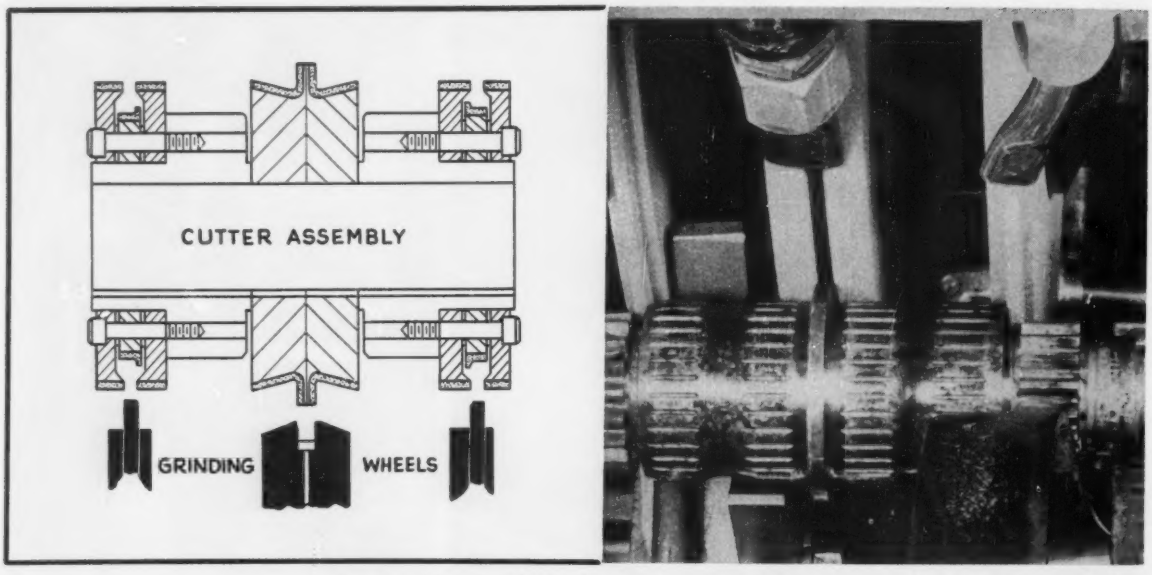
Full Time—Developed jointly by engineers at Koebel and Jones & Lamson Machine Co., Springfield, Vt., the dressers will be another link in the automation of grinding machines. They can be held in continuous contact with the wheel periphery, eliminating down time or cycle stop for wheel dressing.

Tool life is still an unknown. Hundreds of thousands of workpieces probably can be turned out without any need for attention to the dresser. The engineers are sure the life will be many months. The first application has been running on an automotive job for over a year and a half. This certainly indicates that down time for tool change in the production line is minimized.

Attachments — Perpetual form control (PFC) equipment developed by J&L engineers for the cutters consists essentially of attachments for existing machines. The cutter is motor driven in contact with the wheel at a speed somewhat higher than that of the wheel. The difference gives the cutter an effective cutting speed of about 500 sfpm. Coolant is supplied through nozzles at about 25 psi.

A differential feed advances the grinding wheel and cutter in exact increments to compensate for wheel dressing. Correct work size is automatically maintained during the life of the wheel. The process works equally well on resinoid bonded or vitrified wheels.

Choice—J&L engineers say results from production tests have exceeded expectations. The PFC



An assembly of multiple diamond cutters is built to dress wheels for this European-made automotive part. The drawing shows how cutters and spacers are used to build the dressers. Photo shows part being ground

dressers can operate either in continuous contact with the wheel or in intermittent cycle dress in which it touches up the wheel periphery after a predetermined number of parts have been ground.

The cutters can shape grinding wheels from the solid. Time required is minimized. Forms also can be removed with CDP cutters before new forms are cut. A ⅜-in. deep form, 2 in. wide, can be removed in less than 5 minutes.

Ernest V. Flanders, J&L grinding expert who conceived the PFC idea, says that the cutters will dress a wheel from the rough so fast and so inexpensively that it will be cheaper to buy standard wheels and dress them on the machine that it will to use preformed ones.

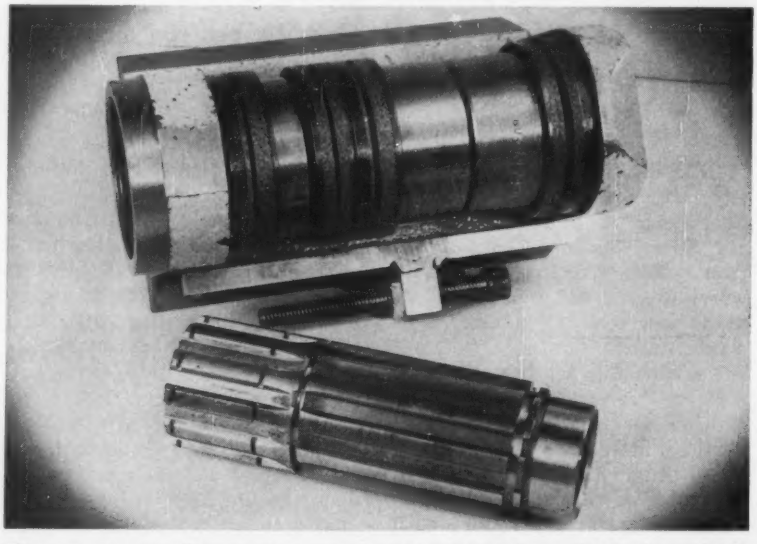
Segmented — A typical PFC dresser is made up of an assembly of CDP cutters. The assembly is built on an arbor using the CDP cutters and spacers to make the correct form.

A single set of cutters can be rearranged in many different patterns on the arbor to dress wheels for many different grinding jobs.

Segments probably will be standardized so a short-run shop can buy an assortment of CDP cutters —build them into a variety of different PFC assemblies.

Applications — At first, PFC-adapted machines will be used on tough form grinding jobs. The first: Narrow grooves in hardened steel automotive and aircraft parts. Engineers who have worked on the project are sure that the potential is broader. For example, they feel that CDP cutters can be oscillated across the surface of a centerless grinding wheel to dress it continuously—adding the long tool life advantage to that operation.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service,* STEEL, *Penton Bldg., Cleveland 13, O.*



The cutter (top) will be used in a J&L Model E grinder to finish the multiple grooves in splined transmission shafts (one shown). The setup grinds four grooves ranging from 0.069 to 0.135 in. wide and from ⅛ to ¼-in. deep

V-Belts

He got new Calm and Reassurance for only 77 cents

Now and then we get human interest reports on the success of our products. These reports are often called "the small incident." We prefer to think of each as one of many success stories—happening every day.

This particular story concerns a man, an iron lung and 77¢. It happened just like this:

For months this man listened to the vibrating sounds of one V-belt after another, slipping, flapping and wearing. In the silence of a hospital room... in the helplessness of an iron lung... these sounds took on terrifying significance. The man knew only that should the belt fail, the respirator would fail, too.

Then, a U. S. V-Belt was installed—cost: 77¢.

From that day, the patient has had new calm and reassurance. The motor hums steadily, the belt performs perfectly, with no sign of wear, no *sound* of flapping.

Just "a small incident" involving only 77¢—but it gives us a pretty good feeling about the quality of material and workmanship that goes into U. S. V-Belts (built with electronic controls and new molding methods) and every "U. S." product.

U. S. V-Belts are obtainable at any of our 28 District Sales Offices, at selected "U. S." distributors, or by contacting us at Rockefeller Center, New York 20, N. Y.

Mechanical Goods Division

United States Rubber

Light and space: The new shop makes the most of two critical factors in any safety program. Lighting is brilliant; floors are uncluttered; there's plenty of space in which to operate

Safety Geared to New Shop Tempo

Construction of a new open hearth shop at Inland Steel Co. created an opportunity to develop a safety program from scratch. Now it's being extended

By R. G. PHELPS
Superintendent
No. 3 Open Hearth Shop
Inland Steel Co.
East Chicago, Ind.

AMONG the dividends that come with the construction of a new plant is the opportunity to build a safety program from the ground up. Inland Steel Co. had this opportunity when it built its No. 3 open hearth shop at East Chicago, Ind.

The shop (now being enlarged 75 per cent) is spacious. It has few pinch points or close clearances. Cranes are easily accessible for maintenance and have good visibility from the operator's cab. Lighting is excellent.

People—This is the sort of safety which can be designed into a plant, but people have to be trained to make it workable. Half the new shop's personnel came from the older shops (most of them promoted to higher ranking jobs) and the rest had never seen an open hearth.

Fortunately, the four furnaces came on the line at one month intervals, so it was possible to man the first furnace with experienced first, second and third helpers. As the other furnaces came in, the second and third helpers were promoted to the next higher job.

Cranemen and switchmen were mostly inexperienced and were sent to No. 1 and No. 2 open hearths for breaking in. While the operations were not identical, the training was invaluable.

Equipment—The new equipment was designed for safe operation and maintenance, but, of course, there were minor difficulties—things like adding steps and changing guard rails which could be handled by department maintenance personnel.

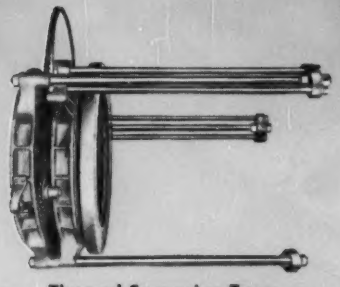
Some stock equipment had to be altered for safety reasons. A front end loader used for banking furnace doors needed a wire screen windshield to protect the operator from furnace heat. Also added were a special insulated gasoline tank and an overhead canopy to protect the operator in case a furnace door should fall.

An enclosed cab with wire mesh panels was installed on an electric hoist used for placing bottle top caps on molds. The first cab used had doors at the rear. When an ingot erupted, the operator had an intense desire to leave the cab—usually right into the path of the eruption. To make his exit safer, the cab entrance was moved to the side away from the ingot, and the door was omitted.

Clothing—The company furnishes all safety equipment (with the exception of safety shoes and conventional work gloves) at no cost to the employee. Second and third helpers are issued two flameproof jackets a year; pit personnel get two jackets and three trousers. If they lose or damage the clothing through negligence, they must pay for it.

To protect the neck and ears, it was decided to add a bib and hood to the second helper's wire screen mask. Fourteen-inch asbestos mittens solved the problem of wrist burns between gloves and jacket. Second helpers must wear complete flameproof equipment only when digging out the tap hole and placing the jet tapper. So dressed, some men have been completely enveloped by flames without injury.

Laborers are required to wear aluminum metatarsal guards when handling brick. They are not worn



Thermal Expansion Type

Linear expansion of the thermal tubes frees the goggle plate for swinging to open or closed position. The contraction of the tubes clamps the plate, forming a gas-tight seal. Sizes: 36" to 120".

Mechanical Type

Powerful clamping force applied at all points around disc periphery provides a safe seal for gas mains from 6" to 84".

Bailey

GOGGLE VALVES

Bailey Valves assure safety plus efficient service on gas washers, blast furnace mains, precipitators and boiler plants. Bailey Valves operate satisfactorily, regardless of the length of time they may stand unused. Their dependability has been proven thoroughly by hundreds of installations in major steel plants.

WILLIAM M. Bailey COMPANY
ENGINEERS
LEADERSHIP THROUGH QUALITY

1221 BANKSVILLE ROAD PITTSBURGH 16, PA

Perfect fit in circular kiln is provided by lining of Armstrong "tailor-made" arch brick.

How extra brick strength increases furnace life

Insulating fire brick have to be really rugged to stand up in an application like the one shown here. Armstrong A-23 Brick are being used to line a rotary cement kiln. In operation, the kiln makes approximately one complete revolution every minute, putting considerable stress on the lining. This, plus mechanical abrasion caused by tumbling action of dry cement, creates severe service conditions for insulating brick. Durable Armstrong Brick have lasted in installations like this for more than 5 years and are still going strong.

There are many furnace applications where efficient insulating fire brick of unusually high strength can lower operating and maintenance costs and frequently increase production.

The Armstrong office near you can help if you have such an application. Call today, or write to Armstrong Cork Company, 2705 Reed Avenue, Lancaster, Pennsylvania.

Armstrong INSULATING REFRACTORIES

INSULATING FIRE BRICK FOR TEMPERATURES UP TO 2800°F

Metatarsal guards save bricklayer's feet

Safety belts are standard where men may fall

by stockers in the scrapyard. Scrap gets caught in them and creates a stumbling hazard.

Rules—The men in the shop wrote their own safety rulebook with the assistance of the Safety Department. We had it printed in Spanish and English on facing pages, and bound in a durable, attractive cover. Although most of the Spanish-speaking employees have some knowledge of English, they understand the rules better in their native tongue.

The rules are practical, with nuisance types kept to a minimum. For instance, full-goggle protection is required on only seven jobs, such as digging out, pouring tests and lancing. Goggles are not comfortable when a man is sweating hard. Melter's glasses can be worn at other times.

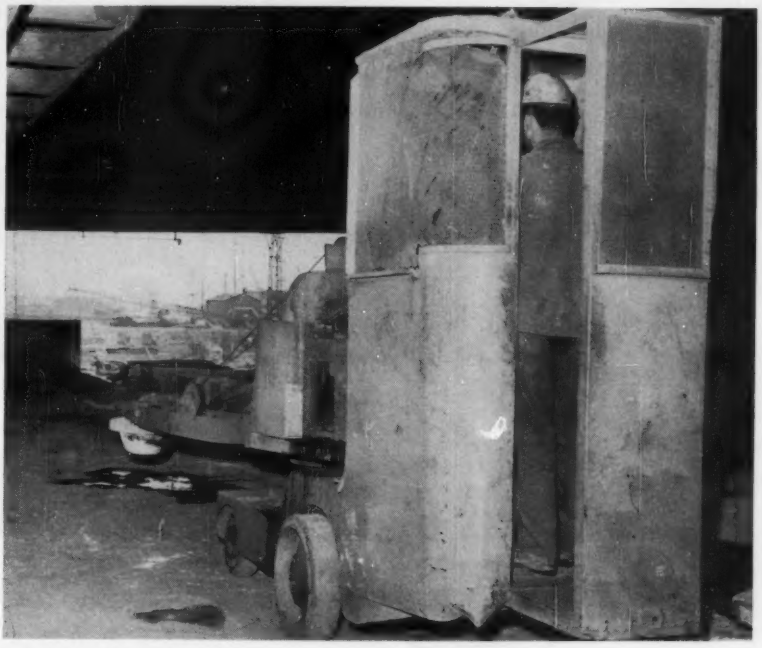
Education—Special awards make the safety program attractive. The men in a division which completes 365 days without a lost-time injury receive a memento such as a cigarette lighter or pocket tool kit. Other awards recognize safety improvements in the entire shop.

Foremen hold at least two safety meetings a month. Division bulletin boards display a daily record of the number of days worked without a disabling injury, and the department bulletin board carries a running record of each foreman's safety meetings and accidents.

Enforcement — The man who commits an unsafe act receives a formal written reprimand. A copy goes into his personnel record, and another goes to his union representative. Each reprimand carries the warning that subsequent unsafe acts will be cause for discipline.

This can range from a day off to discharge for chronic unsafe practices, which is seldom necessary. The desire to keep one's record clean seems to do a lot of good.

Although it is hard to measure the effectiveness of any single element of a safety program, there seems to be a close relationship between the number of safety meetings held and the injury rate. The number of injuries has gone steadily downward as the number of our safety meetings has gone up.



Fast-exit cab protects the operator in case of an ingot eruption

Spring Maker Saves 75% of Storage Space with

COMPARISON PHOTOS show how 75% saving in floor space is achieved. At left is the Mather operation before Republic Bar Carriers. Materials were difficult to reach and handle. Inventory control expensive and difficult. Photo above shows neat rows of Republic Bar Carriers. The same amount of material is stacked in one-fourth the space. Length, width and height of carriers can be designed to meet your requirements for handling materials characterized by narrow dimensions.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

Republic Bar Carriers

GAINS AREA FOR PRODUCTION EQUIPMENT; IMPROVES INVENTORY CONTROL

When a manufacturer is able to reduce storage space requirements by 75%, there is sure to be an interesting story behind it. This one is still unfolding at the Toledo, Ohio, plant of Mather Spring Company, nationally known manufacturer of automotive springs and torsion bars.

Mather was faced with two major problems: (1) Lack of storage space for "in process" springs and materials; (2) Necessity for actually gaining floor space as production increases, to permit installation of new additional equipment.

Republic Materials Handling Engineers were contacted and in cooperation with Mather engineers made a thorough study of material flow, handling, and storage procedure. This study resulted in the design and fabrication by Republic's Pressed Steel Division of a modified version of the standard Republic P-135 Bar Carrier.

Equipped with tiering lugs and channel runners designed for four-way entry by fork-lift truck, the carriers are replacing a four-wheeled unit that Mather has been using. These older units cannot be tiered and consume valuable floor space. Frequent and expensive handling is required to reach desired material. Inventory control has been difficult.

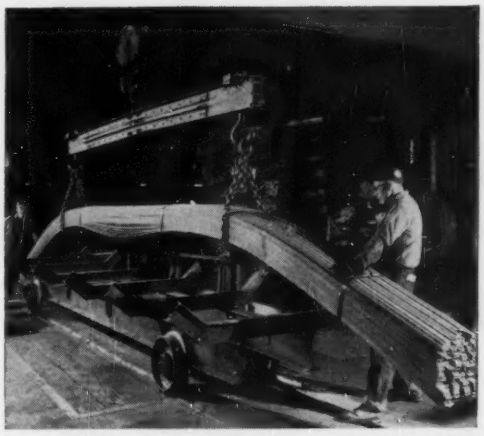
Installation of Republic Bar Carriers has resulted in a 75% saving in floor space, according to Mather engineers. The space gained will be used for installation of new production equipment. And with materials tiered in neat, orderly rows, Mather is able to maintain a close and accurate check on inventory.

Mather will also enjoy future savings, in reduced handling and maintenance costs. Corrugated-steel construction of the bar carriers provides strength, assures long service life at lowest per-year-cost.

Need more space in your operation? A standard unit from Republic's broad line of materials handling equipment may provide the answer. Or you may require the design of a completely new unit. Either way, our engineers will help you. Contact your Republic materials handling representative. Or send us the coupon. There's no obligation.

STEEL

and Steel Products



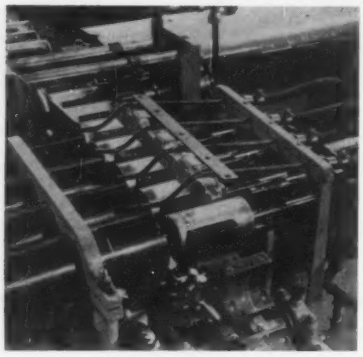
IMPROVE HANDLING of heavy and hard-to-manage materials with Republic Chain Slings. The basket-chain sling shown above is but one of many types available from Republic's Bolt and Chain Division. They are made to your requirements in alloy steel, high test steel or wrought iron. Fittings and accessories are given the same precision processing as the chain itself, assuring uniformity of the total assembly in strength and material. Because each type of sling has a specific use, we recommend talking over your requirements with a Republic chain engineer. Send coupon for more facts.

GAIN STRENGTH AND SPACE for storing of heavy dies, tools, parts, etc., with Republic Wedge-Lock Steel Shelving. It provides maximum loading in minimum floor space. Wedge-Lock Steel Shelving is specifically designed for high stacking of enormous weights. Joints get tighter and stronger as more weight is applied. Yet it is completely flexible to meet changing space requirements. Wedge-Lock Steel Shelving, a product of Republic's Berger Division, assembles quickly and easily. The coupon will bring you more facts.

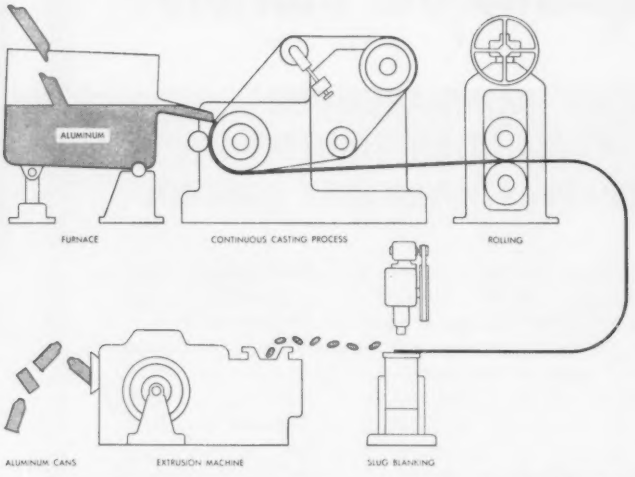
REPUBLIC STEEL CORPORATION
Dept. C-3846
3120 East 45th Street
Cleveland 27, Ohio

☐ Send more information on Materials Handling Equipment;
☐ Have a Materials Handling Engineer call.
Send additional information on:
☐ Chain Slings ☐ Wedge-Lock Steel Shelving

Name_____ Title_____
Company_____
Address_____
City_____ Zone____ State_____



Aluminum cans are inserted into four plastic conveyor tubes. Rams push cans into tube. Nozzles are lowered to blast tubes to opposite end. Speed: 30 cycles a minute



Development of automatic aluminum canmaking will probably follow a layout similar to this one, according to Aluminium Ltd., Canada

Impact Extruded Aluminum Cans

Starting with slugs made from strip, this German firm makes cans from aluminum on an automatic production line. Handling equipment features air and vacuum tube conveyors

SEAMLESS, rigid aluminum cans are being made in production quantities.

Aluminium Ltd., Canada, has disclosed that its German subsidiary, Aluminiumwerke Goettingen, is impact extruding them on a completely automatic production line (see "Cutting Costs with Impact Extrusion," page 85). The firm says that the cans are being sold in Germany at a price comparable to those made of tin plate or black plate.

Plans—Although the production line now uses strip, Gordon Black, director of sales development, sees continuous casting (illustration above) as a direction for immediate progress. He thinks: "It is entirely feasible to start with primary ingot and end with finished, decorated cans ready for shipping."

The line makes cans 2 to 3 in. in diameter and 2 to 6 in. long. Under normal conditions, the firm says three men can complete a change-over from one size to another in about 2 hours.

There are five units in the line: 1. A press to make the can body. 2. A finishing group of machines where the can is trimmed to length, flanged or beaded and the base modified. 3. A degreaser and drying oven. 4. Internal lacquering equipment and oven. 5. Coating and offset printing machines and drying oven. All units are linked by mechanical handling devices many of which use 3 in. plastic tubes with compressed air or vacuum to transport the cans.

Here are some of the operations used in making beer cans.

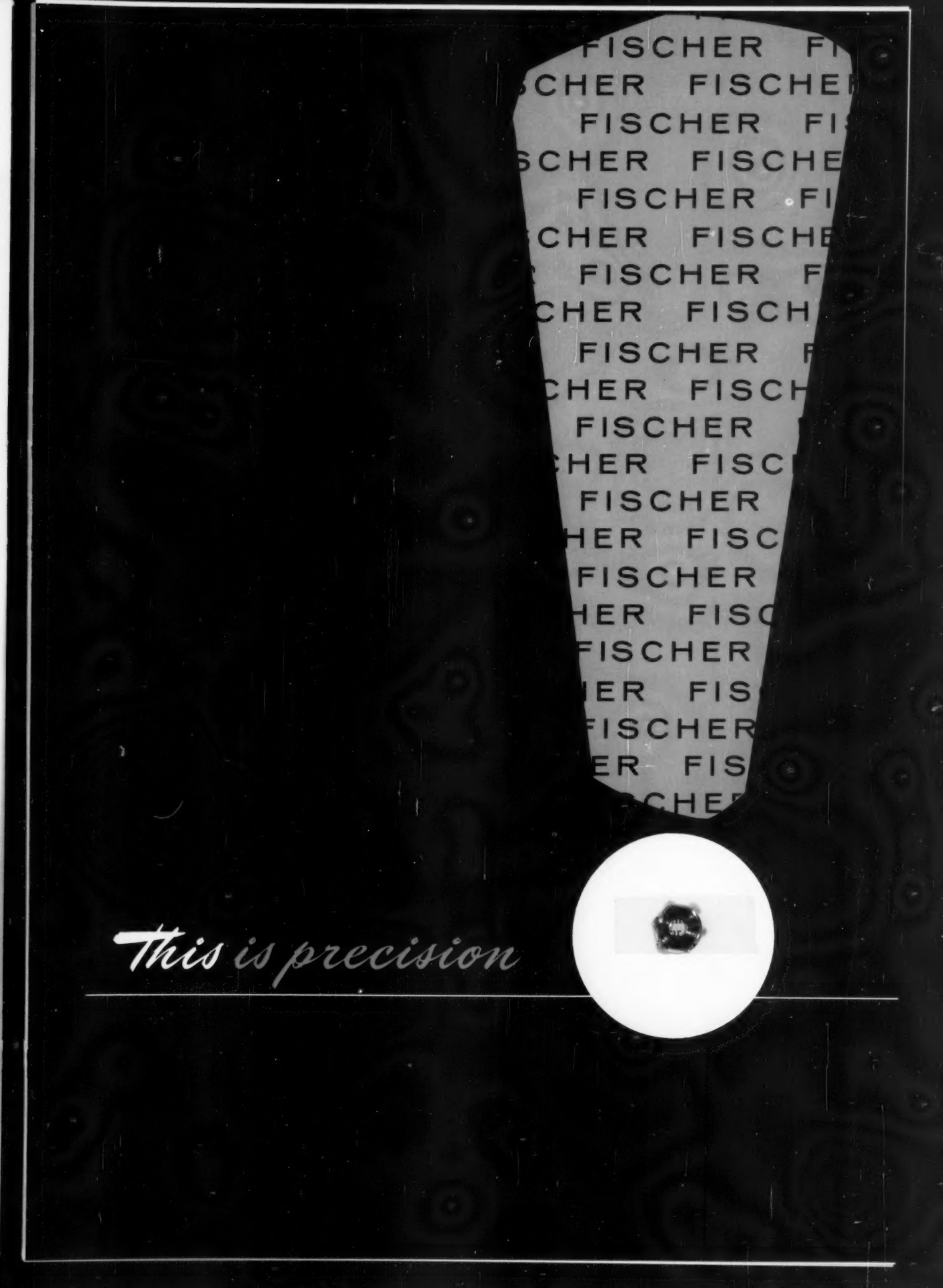
Process—Slugs about the size of a silver dollar are fed into a horizontal impact extrusion press. The press (Herlan 320 ton) extrudes about 60 cans a minute. They are fed down a hopper into a conveyor. Several units trim and form the base.

Cans are pushed by compressed air through 3 in. PVC plastic tubes into a degreaser. An alkaline detergent is sprayed on all surfaces. A cold water rinse followed by a hot water rinse removes all traces of the solution.

After drying, the cans are cransferred through vacuum operated tubes to a spray lacquering machine. Rubber rolls engage and rotate them while spray heads enter and retract. They are dried for 10 minutes in a circulating hot air oven.

After lacquering, cans pass through plastic tubes to the base coating and printing unit.

Progress Ahead—The Canadian firm says that increased use of rigid aluminum cans has depended on the development of faster proccessing. Tin plate equipment was of little help because aluminum cans are much lighter and have a higher surface friction.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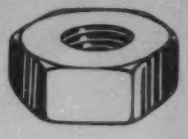
SPECIAL AND ODD SIZE NUTS



MACHINE SCREW NUTS

SEMI-FINISHED SIZE NUTS

HEXAGON CAP NUTS

OPEN END HEXAGON CAP NUTS

KNURLED THUMB NUTS

and this is the story of

"Fischer Turned"

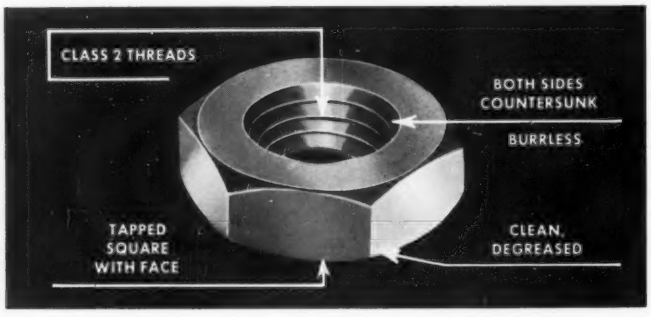
BRASS AND ALUMINUM NUTS

All nuts are *not* the same. The Fischer nut below is a precision product in spite of its thinness.

Like all Fischer brass and aluminum nuts . . . standards or "specials" . . . it was produced by *turning* on unique high-speed machinery. This process gives Fischer nuts an accuracy and uniformity which speed assembly operations and cut costs through faster starting . . . smoother, easier running . . . superior bearing surfaces . . . elimination of "blanks" or rejects.

Yet you pay no premium for this extra quality . . . Fischer *precision-turned* nuts cost no more than those produced by other, less accurate methods.

Specify "Fischer" on your next order. Prompt delivery is assured by large stocks of all standard types and sizes . . . "specials" are produced quickly and economically.



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C-247 FS

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Tape Guides Milling Machine

It will be used to produce aircraft parts and complex tools and dies at Glenn L. Martin Co., Baltimore. Officials think it'll save many weeks of tool setup and change time

A NEW tape controlled milling machine "marks the beginning of a new era in aircraft production," in the opinion of G. T. Willey, vice president-manufacturing, Glenn L. Martin Co., Baltimore. He says it may substantially reduce lead time in the production of planes and missiles. It'll cost about $250,000.

Due to be delivered to Martin in about a month, the machine should be on full production in seven or eight weeks. Mr. Willey says it will save many weeks of tool setup and change time. These operations, he says, are among "the most time consuming processes in modern airframe manufacture."

Plastic Tape—Martin's machine was engineered and built under a joint development at Bendix Aviation Corp.'s Research Laboratories Division in Detroit and Kearney & Trecker Corp., Milwaukee. The K&T profile milling machine has Bendix numerical control.

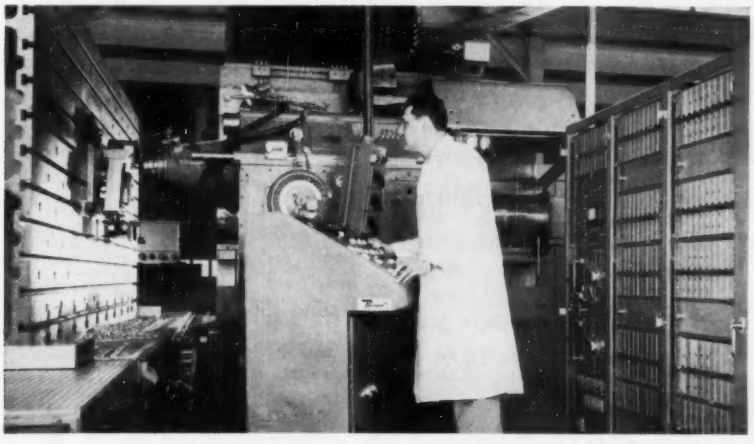
The control system is similar to that on other contour milling machines except that it uses a punched plastic tape instead of a magnetic tape. (See "Machines That Obey Orders," STEEL, Jan. 21, p. 68.)

Steps—To get the right tape for a job, an engineer determines required dimensions from a blueprint and enters them on a process sheet. The figures are typed on a standard Flexowriter that turns out a typed checking copy and a punched paper tape.

The tape is fed to a computer that uses the punched information to calculate and punch a rugged plastic tape.

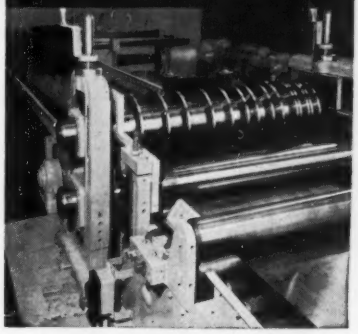
Dr. A. C. Hall, general manager of Bendix research laboratories, says: "Built-in self-checking features in the tape preparation system detect and correct any errors in preparing the process tape. Errors in the control tape are in turn detected by the machine control unit as it reads the tape and translates it into three-dimensional cutting operations by the tool itself."

The Start—The control system is based on that used in the earlier Bendix cam milling machine. Bendix engineers say they may modify the basic system for two-dimensional positioning, which also has good potential for metalworking.



From the console, the operator monitors the machining of aircraft parts. The machine is controlled by punched tape being read by a photoelectric cell in the cabinet at right. The spindle is driven by 20 hp

YODER SLITTING LINES



PAY BIG DIVIDENDS WORKING ONLY ONE DAY PER WEEK!

In one plant, two Yoder tube mills and about 50 punch presses are being supplied with slit strands by one Yoder Slitting Line operated an average of only *seven hours per week.*

In another plant, a Yoder slitting line, *operated from six to eight hours per week,* is supplying two intermittently operated roll forming machines with total requirements averaging 100,000 feet per week.

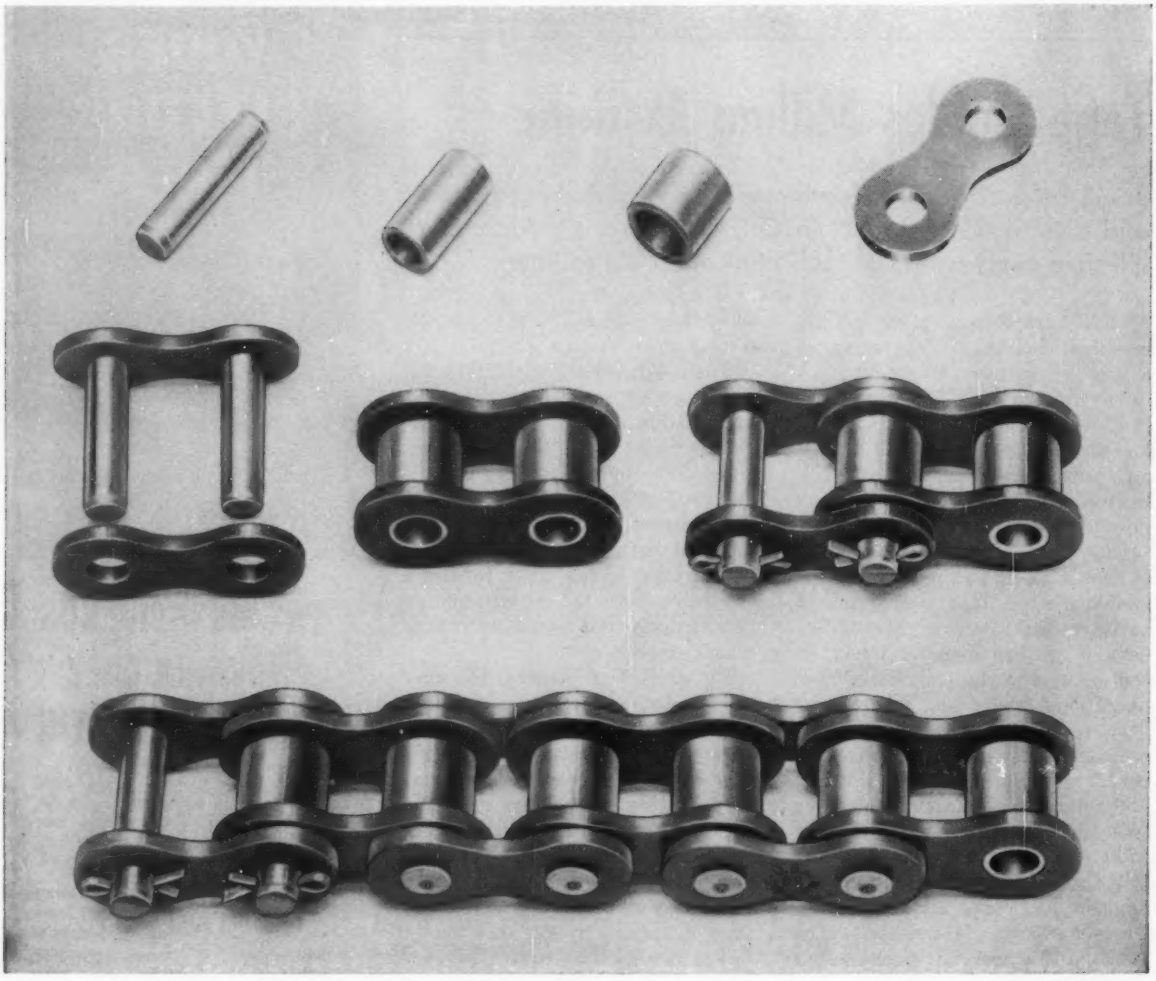
These typical examples demonstrate, first, the big potential output of a relatively small, inexpensive Yoder standardized Slitting Line and, secondly, its big profitability. Assume production of only 35 tons of slit strands per 8 hour shift, one day per week, and the total per year would be 1750 tons. Estimating the saving in slitting cost at only one-half cent per lb., the total annual saving would be $17,500.00.

Besides the big convenience of doing your own slitting, such savings will often repay the investment in a few months.

The Yoder Slitter Book **is a comprehensive treatise on slitter operation and economics, with time studies, cost analyses and other useful data. It is yours for the asking.**

THE YODER COMPANY
5502 Walworth Avenue • Cleveland 2, Ohio, U. S. A.

ENGINEERING YODER MANUFACTURING SLITTING LINES



Elements and assemblies of a roller chain. It is basically a series of connected bearings

Metal Powders Solve Production Problems

Members of Metal Powder Association at 13th annual meeting in Chicago last week heard examples in production of roller chain and metal filters and use in brazing

ONE of the problems encountered in the use of roller chain is fretting corrosion. Adequate lubrication is the usual answer.

But manufacturers using roller chain in food processing, can making, tobacco and textile machinery must go easy on chain lubrication or risk contaminating their product.

Porous Bushings — Whitney Chain Co., Hartford, Conn., solved this problem and improved its product by using an oil-impregnated, sintered steel bushing in the bearing section of the chain. The new bushing provides the mechanical and oxidation-inhibiting effects required.

The bushings have high strength, good fatigue characteristics and sufficient porosity to provide adequate lubrication.

Mixture—C. L. Richards, field product engineer, told the MPA that the powder mixture which gives the best results is 94 parts 100-mesh iron powder (low-cost reduced type), five parts 100-mesh copper powder (standard electroly-

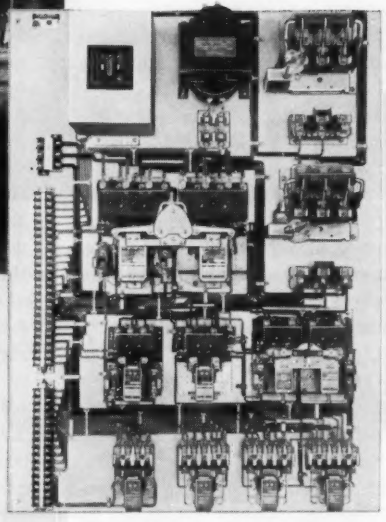
SQUARE D PRESS CONTROL

Built the Way You Want It!

Square D control is used by virtually every stamping press manufacturer in the country—and is approved by the three largest automobile manufacturers.

What's behind this preference for Square D? Biggest reason, we believe, is *completeness* of line which enables us to *custom build* to individual requirements, using *standard* control components. Actually, that has a bearing on a lot of things—including delivery, safety, uninterrupted production, maintenance parts standardization, plus field engineering service.

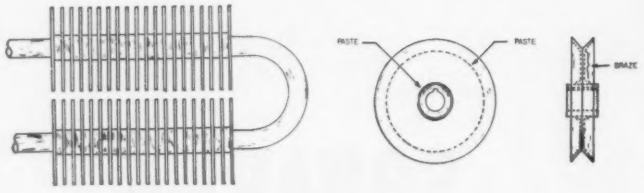
On the next press you buy, specify SQUARE D CONTROL.



above • **typical Square D press control panel, designed and built to customer specifications, using standard components**

***NOW...EC&M* PRODUCTS ARE A PART OF THE SQUARE D LINE**

SQUARE D COMPANY



Brazed condenser assembly and fan belt pulley. Use of high density paste on pulley assures total penetration of large interfacial areas

tic or reduced type) and one part 325-mesh graphite powder. A small amount of fine stearate is added to hold the green compacts together.

Parts are sintered in dissociated ammonia at 2050°F for about 15 minutes. Standard roller chain bushings with thin walls are resintered at 2080°F for 10 to 15 minutes. Density is 6.6 to 6.8 gm/cc.

Shot Peened—After sintering, the parts are shot peened. This modifies the stress raising characteristics of surface irregularities and increases fatigue life.

After oil quenching from 1600°F, parts have a hardness of 35 to 40 Rockwell C. Tensile strength of the material runs above 75,000 psi. Wear life in applications where contamination is a serious problem has been extended as much as three or four times.

Sintered Filters—Lambert H. Mott, general manager of Connecticut Metals Inc., Meriden, Conn., cited several developments in metal powder filters. One of the most interesting is a magnetic filter which is designed to protect wet coil type servovalves in aircraft hydraulic systems.

The filter element is made of a material which has high magnetic permeability and operates in a strong magnetic field. This causes fine contaminant particles to coagulate or agglomerate into larger particles which can be stopped by a coarser filter medium.

Performance—A filter element was constructed of a medium that retained 10-micron particles in an unmagnetized condition. When inserted into the magnetic circuit, the 10-micron element removed 96 per cent of all particles greater than 3 microns in one pass.

A magnetic filter extended the life of a wet coil servovalve in one ordnance component eight times.

Stainless—Porous stainless steel filter elements have found many uses in nuclear energy equipment. Example: Detection systems for fuel element failure. A sintered stainless element is placed in a monitoring device, and the degree of radioactivity of the filter element is used as a criterion of fuel element condition.

A similar example is the use of sintered metal to sample the nonsoluble contaminants in deionized water for subsequent analysis. Sintered stainless has been used as a vent for radioactive gases generated in a reactor. Proper design of the stainless element maintains a controlled gas pressure within the system.

Cooling—There is increasing research and development on porous materials made from metal powders for use in the transpiration cooling of high temperature engines. Although development is in its early stages, differentially permeable materials have been produced.

They have sufficient strength and ductility to be cold formed into conical elements, air foil shapes and other structurals.

Joining—The use of metal powders in brazing and soldering has great potential, P. D. Johnson, assistant technical director of the Chemicals - Pigments - Metals Division, Glidden Co., Hammond, Ind., told the MPA.

The substitution of brazing paste for preshaped forms simplifies operations and lowers costs. This is especially true in joining mild steel by copper brazing.

Example—A part is to be brazed with rings of No. 26 wire that are ½-in. in diameter. A pound of rings (about 9000) would cost about $2.70 to fabricate, or as much as $9 if bought from a service organization.

The substitution of a prepared copper paste would cost $1 or less a pound.

Application—A paste is often the only practical way to apply a brazing alloy. A condenser assembly (see sketch) required joining at many points where the fins came in contact with the tube and bushing. Placing a copper ring at each of the joints takes a lot of time.

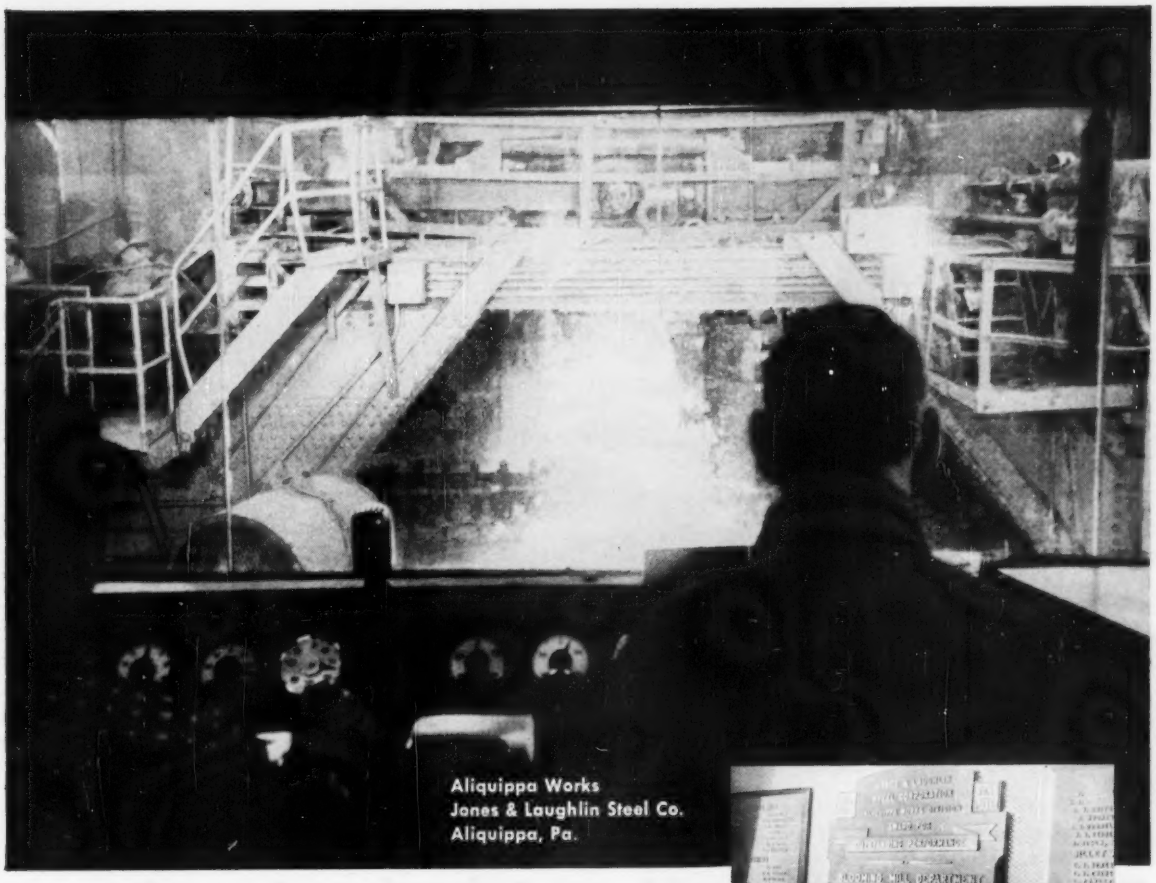
The better procedure, Mr. Johnson declared, is to use a copper paste of paint consistency that can be sprayed on or applied by dipping. Although the part becomes copper flashed, corrosion protection is provided, and the quantity of copper used can be minimized by controlling the viscosity and copper per unit volume of paste.

Silver Soldering—In silver soldering steel, the brazing medium and flux are normally applied separately. This takes time. Varying and often excessive quantities of flux are used. Silver solder pastes can incorporate just enough flux to meet specific requirements.

This advantage will be extended to other pastes using refractory metal powders to join chemically reactive metals.

Other Alloys—A number of important brazing alloys have limited use because they are brittle and difficult to shape. Examples: 10-12 Si, balance Al (aluminum brazing); 66 Ni, 20 Cr, 9 Si, 4 Fe, 1 others (heat and corrosion resistant alloy brazing); 85 Cu, 15 P (copper and brass brazing).

If these alloys are melted, shotted to finely divided particles and converted to paste formulations, they can be used easily.



An ingot a minute!

and never a lubrication failure with Cities Service EP-21 Lubricant!

At Jones & Laughlin's Aliquippa Blooming Mill, they believe in production with a capital "P"!

Not only does J&L's Aliquippa Mill hold the world's record for ingots rolled in an eight hour turn (576), but they've set a year-in, year-out average of an ingot per minute!

How do they sustain this production for such long periods?

One answer lies in their modern, 44-inch, two-high reversing unit, powered by four 3000 h. p. motors arranged in tandem twin drive.

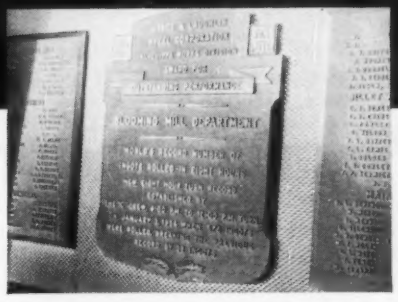
Another can be found in their lubricant . . . Cities Service EP-21.

Used on main bearings, manipulator slides and window liners, Cities Service EP-21 and its superior additives provide an unusually tough film . . . tough enough to stand the highest pressures, the greatest shock loads with no loss of lubrication, no danger of rust or corrosion.

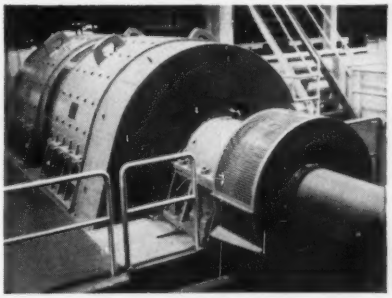
Yes, Jones & Laughlin is pleased with Cities Service lubricants! You'll feel the same when Cities Service goes to work in your operation. Talk with your Cities Service Lubrication Engineer. Or write: Cities Service Oil Company, Sixty Wall Tower, New York 5, N. Y.

CITIES SERVICE

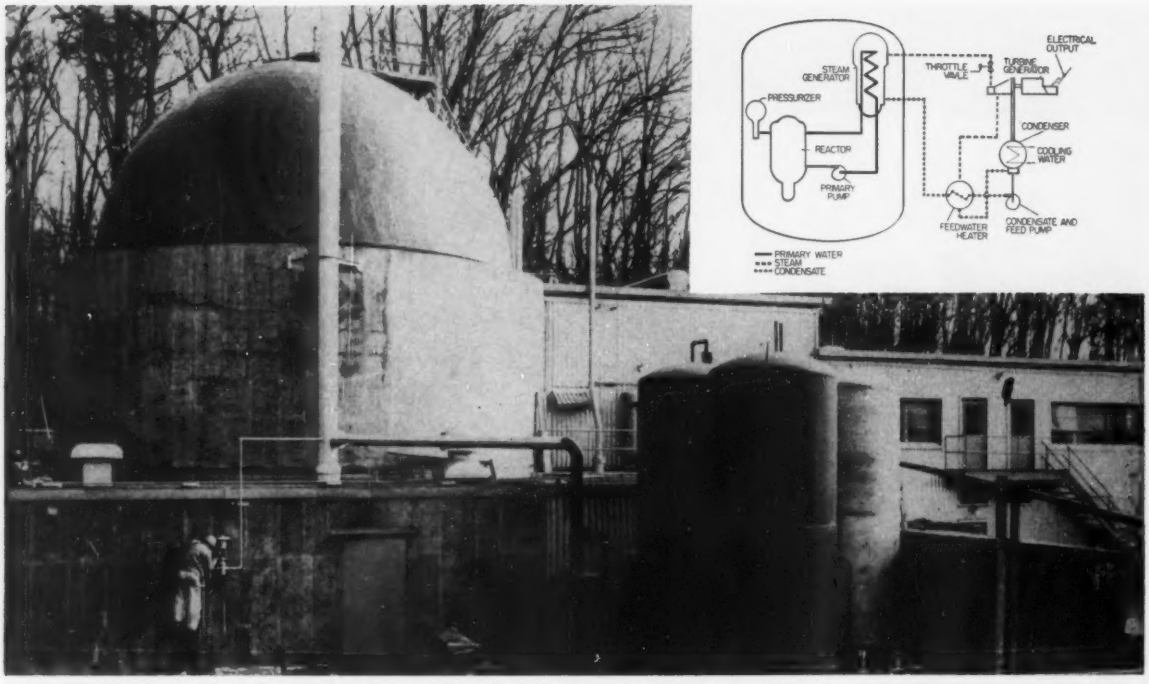
QUALITY PETROLEUM PRODUCTS



Award for 8-Hour Turn Record is displayed proudly outside mill. J&L smashed previous record by 38 ingots—rolled up new total of 576! Year-in and year-out, the plant averages an ingot a minute, with flawless lubrication provided by Cities Service.



Four 3000 h.p. Motors power the blooming mill at J&L's Aliquippa Works. These are 70 to 140 rpm, double-armature units arranged in tandem twin drive. At 70 rpm, they can reverse in under a second. Equally flexible is the mill's lubricant—Cities Service EP-21.



Army package power reactor with the vapor container at left. Schematic (insert) shows how the system works

Package Reactor: New Jobs for Atomics

We think of nuclear power plants for the generation of electricity as large installations. Work now in progress promises to open up a new chapter in this use of atomic energy

CAN an atomic power plant be scaled down to fit the needs of the small user, a community of 2000, a plant with electric furnaces, or one that has a supply problem with conventional fuel?

We could get the answer from tests being run on the small atomic plant (above) at Ft. Belvoir, Va. It's called the Army Package Power Reactor (APPR).

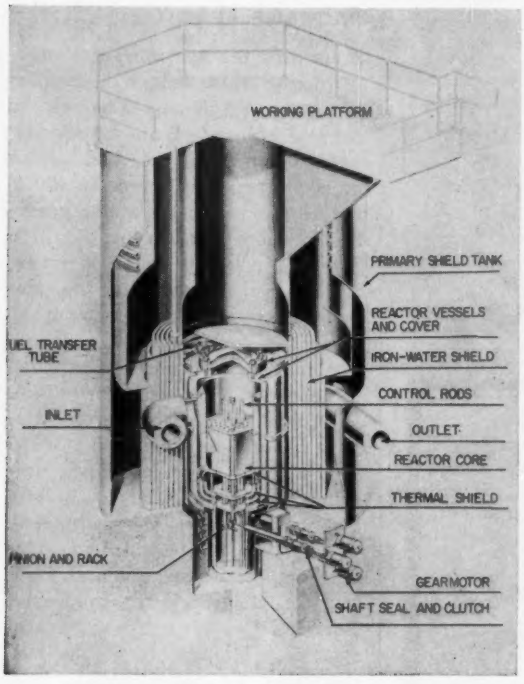
The reactor was built for the Army by Alco Products Inc., Schenectady, N. Y., under contract to the AEC. Technically, it's a 2035-kw, pressurized water type. The pressurized water concept was proved in the *Nautilus*. This is the first completely integrated generating system using the principle. It's also the first power reactor using stainless steel clad fuel, with water as the coolant and moderator.

Origin—The APPR is so named because its components can be transported by air and put together at a remote site in a hurry. Military advantages stem from the elimination of the transportation and storage of bulky conventional fuels.

It is designed to operate at full power for a year and a half on a single charge of nuclear fuel smaller than a barrel and weighing only a few hundred pounds. Over the same period, a comparable conventional plant would consume about 60,000 barrels of fuel oil—a medium size tanker load.

Under peacetime conditions, it's predicted that transportation savings will counterbalance the greater capital cost of the nuclear plant. At many remote places, it will pay for itself in a few years.

Operation—The schematic layout shows how the reactor works. Pressurized water circulates through it, is heated and passes to a heat exchanger where it transfers its heat to water in a secondary loop. This heat converts the secondary water to steam which drives the turbine. A conventional power plant uses coal. Nuclear reaction provides the concentrated heat needed for the APPR.



Drawing above shows reactor core, pressure vessel and shield. Overhead view of core structure (right) shows grid that provides space for fuel elements and control rods for the unit

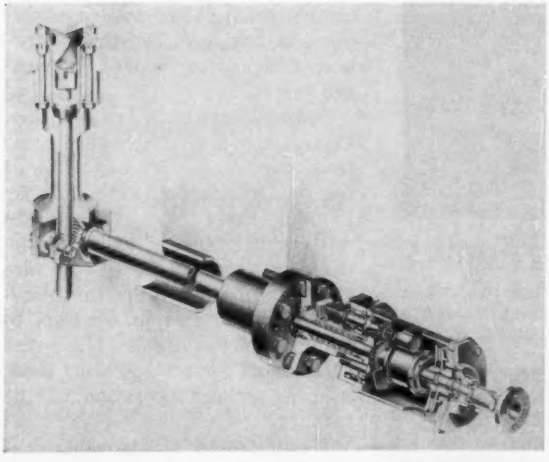
Heat furnished by the system is so great that engineers estimate the weight of coal required to generate an equivalent amount for one year would exceed 24 million lb. Nuclear fuel burned in a corresponding period will weigh about 11 lb.

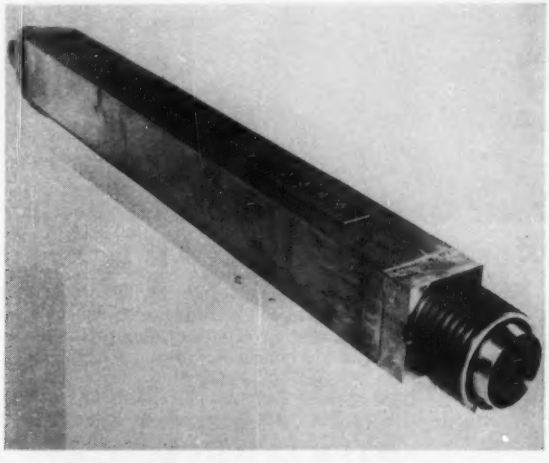
Breakdown — Main components of the primary system are: 1. Reactor vessel and core. 2. Control rods and drives. 3. Two coolant circulating pumps. 4. Piping. 5. Steam generator. 6. Pressurizer. 7. Water purification equipment. 8. Shielding.

The reactor core forms the heart of the system. It's made up of 38 fuel elements and seven control rods and is housed in a pressure vessel constructed of A-212 carbon steel plates clad with 0.125 in. of 304L stainless steel.

The fully enriched uranium dioxide is incorporated into flat plate type elements. Each fuel assembly consists of 18 fuel plates brazed into a pair of 304L stainless steel side plates which are 27 in. long, 2.863 in. wide and 0.050 in. thick.

Reactivity is lowered when control rods are inserted in the core. Boron enriched with isotope B-10





The control rod mechanism above is a rack-and-pinion type drive actuated through a low friction, high pressure seal by a commercial gearmotor. The major part of the drive mechanism is outside the reactor, so parts requiring maintenance can be removed without depressurizing the system. Complete fuel assembly is shown above

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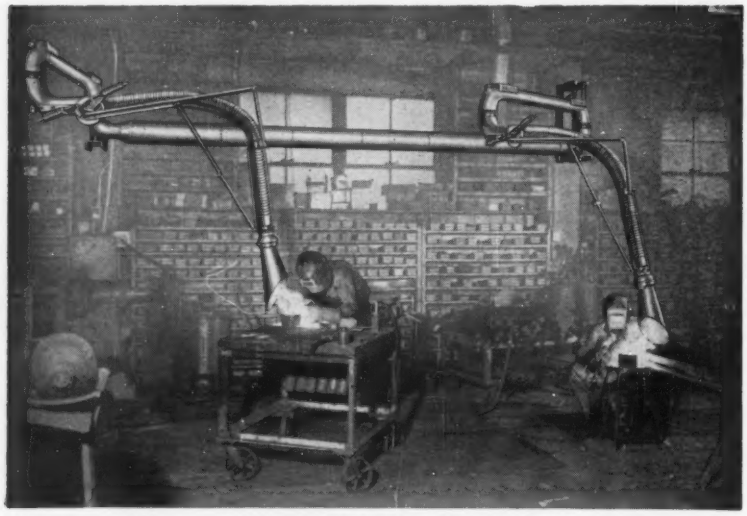

Keep Plant Air CLEAR of Welding Fumes

Welding shops equipped with Ruemelin Fume Collectors are assured of a clean, healthful atmosphere. Harmful fumes, heat and smoke are eliminated *at their source*, before they have a chance to spread throughout the shop. This lessens fatigue . . . improves working conditions . . . paves the way for increased plant production. Ruemelin Fume Collectors are approved by Industrial Commissions and insurance companies. Thousands in service. Available with 9 ft., 15 ft., 17 ft. and 20 ft. reach. Write for Bulletin No. 37-E.

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PACKAGE REACTOR . . .

is used as the neutron absorber.

Cooling water enters the reactor vessel at 431°F and 1200 psi to prevent boiling. While circulating upward between the fuel plates at 4000 gpm, it is heated to 450°F before passing to the steam generator. There heat from the high pressure primary water is transferred to the water in the secondary system, giving steam to drive the turbine.

A number of companies supplied components: Canned rotor pumps, Westinghouse Electric Corp., Pittsburgh; stainless steel piping, Tube Turns Co., Louisville; vapor container, Bethlehem Steel Co., Bethlehem, Pa.; water demineralizers, General Ionics Corp.; steam turbine and generator, General Electric Co., Schenectady; condenser, Lummus Co., New York; control systems, Minneapolis - Honeywell Regulator Co., Minneapolis.

The reactor vessel, control rod assembly, pressurizer and steam generator were built by Alco, the prime contractor. Oak Ridge National Laboratory, Oak Ridge, Tenn., provided the fuel elements and control rods.

Titanium Control

Gamma rays from radioactive cobalt 60 have been put to a new use by scientists of the Westinghouse Research Laboratories.

Dr. Daniel Alpert, associate director of the laboratories, explains it this way: "The rays detect and control the level of molten titanium in a new 'cold hearth' arc furnace designed to prepare the purified metal.

"Gamma rays are penetrating, high-energy radiations which come from spontaneous disintegration of certain radioactive atoms. By beaming these rays through the walls of the furnace and the 12-in. titanium ingot inside it, we are able to 'see' the level of the titanium. We use this information to automatically raise or lower the ingot to its correct operating level, insuring proper operation of the furnace."

Westinghouse believes this control brings a new degree of reliability and safety to titanium arc furnace operation.

Model Aids Layout

Getting a double check on new ideas is easier with a scale miniature like this one

THE model in the picture below was built to check the design of the ultramodern Evinrude Motors plant now going up in Chicago. Both plant and model were designed and built by McClure, Hadden & Ortman Inc., Chicago.

Features—Evinrude's layout incorporates a one-directional flow from receiving to shipping. Parts are palletized for movement to subassembly, storage and main assembly lines.

The designers arranged the storage area so that first-in, first-out control can be maintained automatically.

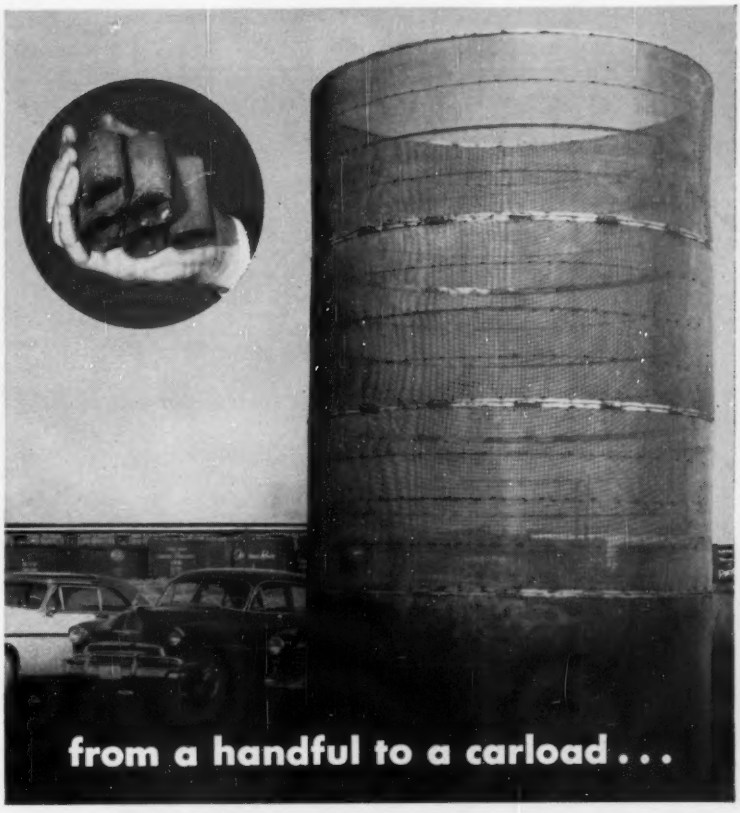
The main assembly line features a flexible arrangement that permits production to be switched quickly from one type to any other of six types made by the firm.

MODEL
. . . is design proving ground

The plant is entirely on one floor except for the paint department which is two stories high. The building is constructed of noncombustible, insulated aluminum panels. The roof is covered with precast, insulated tile.

Conditioning — The air system will handle 225,000 cu ft a minute. Paint departments are pressurized and supplied with clean, filtered air to insure high quality.

The plant is 270 by 600 ft. Administrative offices occupy more than 12,000 sq ft. The east to west bays are 40 ft wide; north to south bays are 30 ft wide.



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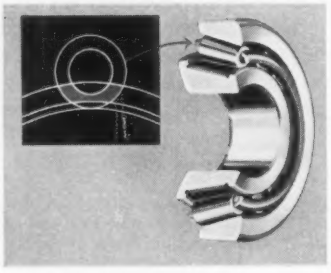
Bearings "keep cool" under hot steel!



HIGHER FLANGE IMPROVES ROLLER ALIGNMENT

As shown by the gray area above, the higher flange provides a large two-zone contact area for the roller heads. This greatly reduces wear—practically eliminates "end play". Larger oil groove provides positive lubrication.

Watch it! Coming down the line—another half-formed slab of red-hot steel! And with it comes a supreme test of bearing excellence. Bower Bearings are equal to it—helping to keep this mill operating smoothly and continually despite heavy loads and extreme temperature. Whatever the job, there's a Bower Bearing engineered to perform just as dependably when the going is toughest. Rigid quality controls and basic bearing design refinements like those shown at the left have reduced Bower Bearing failure to a practical minimum. If your product uses bearings, specify Bower! There's a complete line of tapered, straight or journal roller bearings for every field of transportation and industry.

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Manipulator Provides Universal Positioning of Welding Head

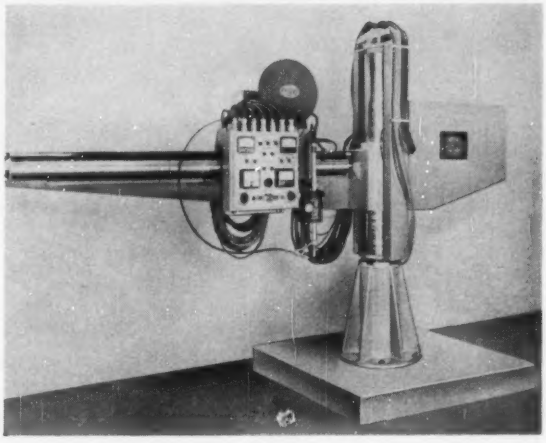
Jet engine components and other intricate parts are welded by this machine.

Automatic heads for inert gas arcwelding with tungsten or consumable electrodes can be mounted on it. The head has an accurate variable speed traverse.

An electric console controls complete programming. Electronic timers are used for sequence control.

The console includes a welding power source with current slope control, accessories for control of shielding and back-up gases and a self-contained water circulating unit.

Manipulators and control consoles can be designed and constructed to meet production line requirements. *Write*: Machine Welding Department, Air Reduction Sales Co., a division of Air Reduction Co. Inc., 150 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 2-6700



Boring Machine Combines Accuracy With Versatility

Model O Bore-Matic can be set up to do straight and taper boring, straight and taper turning, facing, chamfering, grooving (diameters and faces) and reaming. With special attachments, it can do slot milling and contour or spherical boring or turning.

Either the work or the tools can be rotated. Many operations on one or more workpieces can be done simultaneously or in sequence.

Tolerances of 0.0002 in. are easily held on production work. The machine is suited to instrument making operations and toolroom work.

Feeds are ½ to 50 ipm. Maximum table travel is 9 in., and maximum cross slide travel is 5 in.

Multiple spindle boring heads have interchangeable front plates which can be arranged in any combination on center distances as close as ¾-in.

Center distances closer than ¾-in. are obtained from a cross slide which indexes to another cluster on the same plate. Heads are driven by a single belt from a motor mounted on top of the head unit.

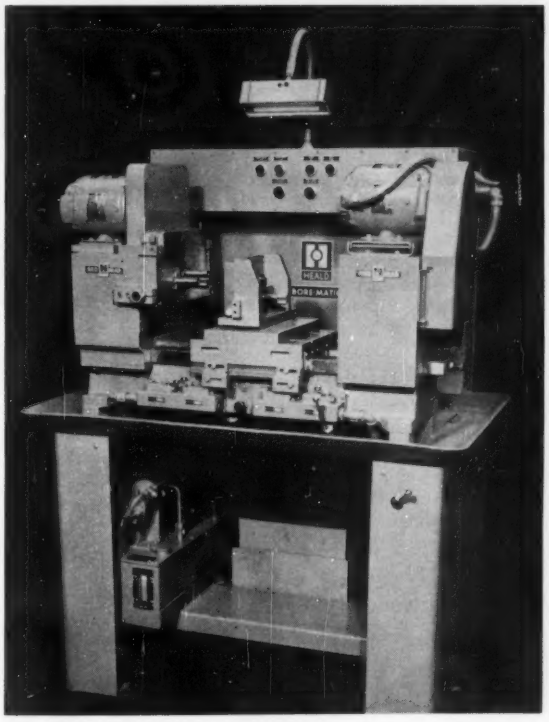
A variety of spindles, ¾ to 3½-in., can be used in combination.

It is easy to change spindle plates. One plate can be bored to a head setup for each multiple hole boring job. When the holes do not overlap, one plate can be used for more than one job—heads are mounted only in the spindle plate holes needed for each job. The others are left empty.

Hydraulic crossfeed units permit grooving and facing operations to be done with rotating tools.

The swivel support for single borings heads can be turned 10 degrees on either side of the center line. This permits taper boring and turning of rotated work.

The cross slides allow the work or tooling to be indexed horizontally for multiple hole boring and for generating faces, grooving and undercutting rotating work.



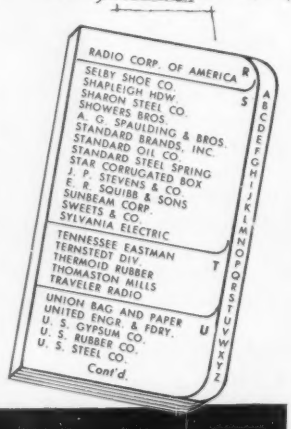
A vertical work slide (mounted on a cross slide or table) provides the horizontal or vertical indexing for multiple boring without rechucking the work. *Write*: Heald Machine Co., Worcester 6, Mass. *Phone*: 5-3191

Flow principle applied to production of steel gratings. Logan Roller Conveyors form work tables and permit easy movement of product through successive operations. Gaps between adjoining sections provide passageway for operators.

The LEADERS use Logan

. . . to keep things moving, in the modern industrial plant. Costly stops and starts are avoided—with correctly engineered Logan Conveyors. This famous equipment delivers materials and parts at convenient working heights, dispatches the product without manual effort to the next operation, puts flow into production. "Stay with the leaders—specify Logan Conveyors." Remember, they give you that something extra in engineering and design. Write for further information or for nearest engineer to call.

LOGAN CO., 535 CABEL ST., LOUISVILLE 6, KY.

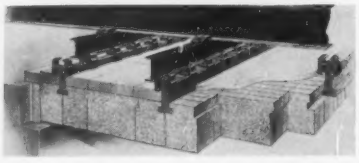


Logan Conveyors

NEW PRODUCTS and equipment

Refractory Arch

A dense refractory hanger is used in the type ALR arch. It can be applied without considering temperature limits of a metal hanger. Small component parts make it easy to install and adjust to furnace dimensions.



Because of its low heat storage, the arch can be used in any unit that requires rapid heating and cooling and is operated on a periodic cycle—such as heat treating furnaces. *Write*: M. H. Detrick Co., 111 W. Washington St., Chicago 2, Ill. *Phone*: Randolph 6-6974

Fluid Power Cylinders

This line of double acting cylinders is made of seamless steel tubing. Foot lug, center lug and flange head mountings can be combined to suit virtually any fixed mount.

Sizes: 2, 2½, 3¼, 4, 5, 6, 7 and 8 in., with either standard or large diameter rams. Stroke lengths are 36 to 158 in. *Write*: Oilgear Co., 1560 W. Pierce St., Milwaukee 4, Wis. *Phone*: Mitchell 5-6715

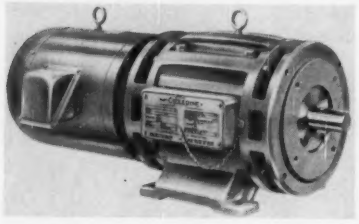
Power Transmission

Cycledyne is a stop-start power drive and cyclic control device that minimizes shock loading, violent power overload peaks and electrical contact arcing.

All units (there are over 200 frame assembly variations and interchangeable designs) can be interposed in every type of power train —between any drive motor and any driven mechanism.

The drive provides all cyclic op-

NEW PRODUCTS and equipment



erational functions for the machine —starting, stopping, inching, positioning, holding, acceleration control, deceleration control and torque limiting. *Write*: Cycledynamics Inc., 19025 W. Davison, Detroit 23, Mich. *Phone*: Broadway 3-3700

Protects Welding Nozzle

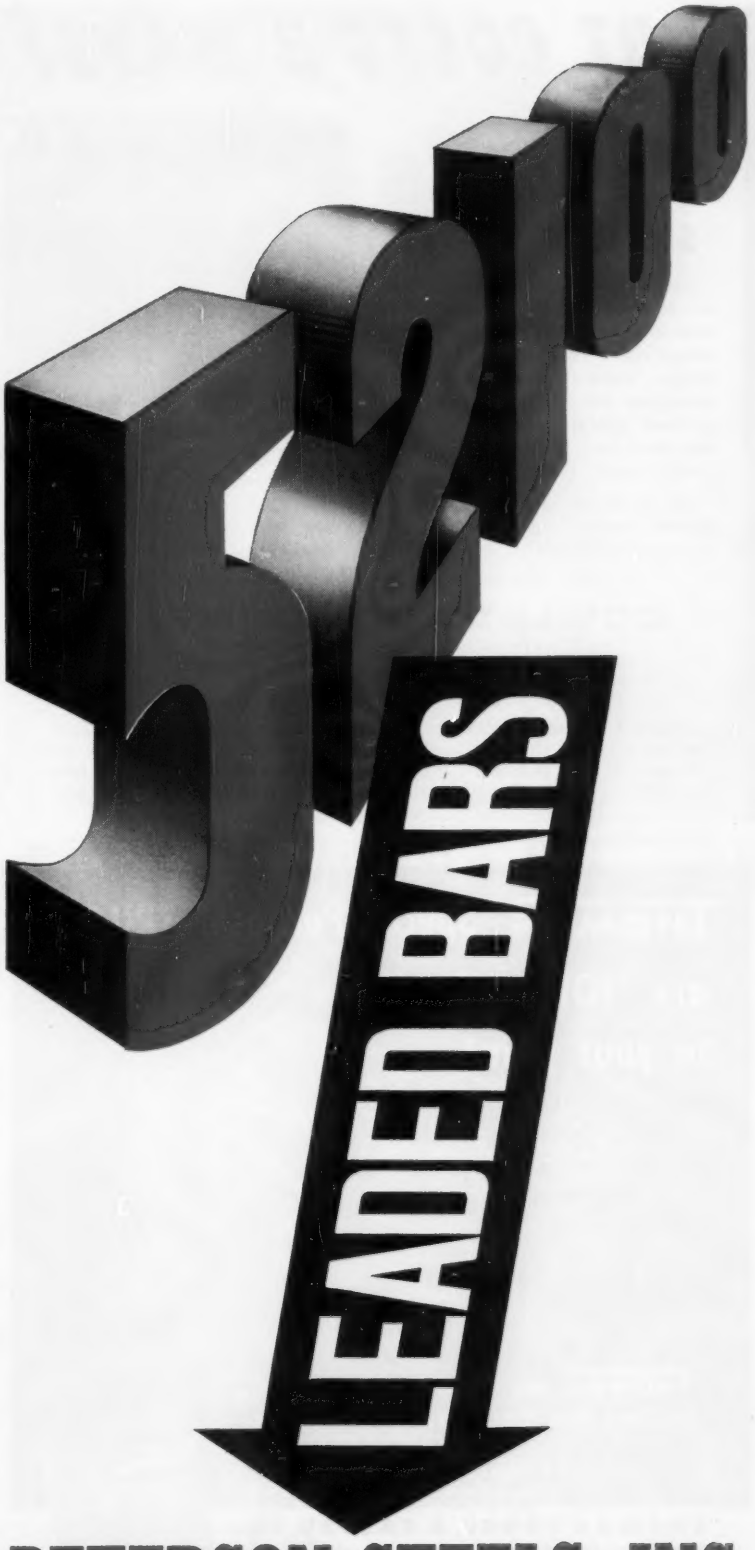
Sigma Nozzle Compound 65 prevents molten splatter from sticking to welding nozzle surfaces. The silicone-containing material is applied before welding and forms a thin protective coating over the bore and mouth.

Under normal conditions, the greaseless, odorless and nontoxic compound will last 8 hours. *Write*: Linde Air Products Co., a division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y. *Phone*: Murray Hill 7-8000

Comparator

The Dual-Aire Air-O-Limit is used at the machine to gage close tolerance grinding or lapping operations. It provides two separate magnifications simultaneously without switch over.

You can use the low magnifica-



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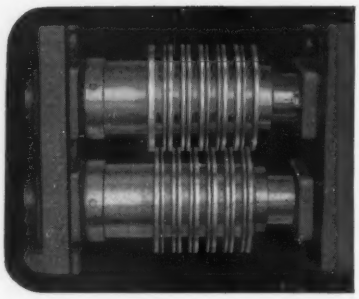

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THOMAS MAKES ALL KINDS OF TRUCKS, SKIDS, CASTERS AND WHEELS

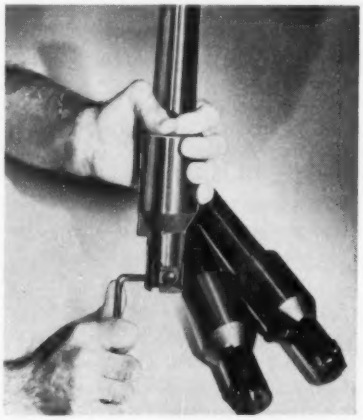
NEW PRODUCTS and equipment

tion scale during preliminary stages of the work. It reads deviations in 0.0001 in. increments.

As the finish size is approached, you can read part size to within a few millionths from the high magnification scale. *Write*: Pratt & Whitney Co. Inc., West Hartford 1, Conn. *Phone*: Adams 3-7561

Combination Tool

You don't have to grind an edge on this combined boring and spotfacing tool. It uses throwaway blanks. When one edge is dull, simply index to a new cutting edge.

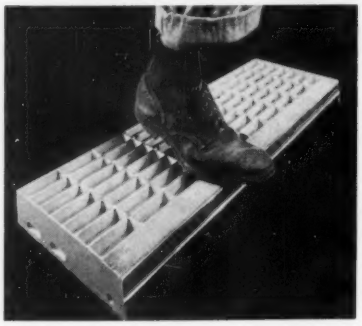


The dial head of the adjustment screw for the boring blank is calibrated in 0.001 in. increments. *Write*: Wesson Co., 1220 Woodward Heights Blvd., Detroit 20, Mich. *Phone*: Jordan 6-1500

Aluminum Stair Tread

This diecast aluminum alloy tread offers corrosion resistance and strength. Loads over 3000 lb have been handled.

A rough, slipproof front surface is provided by fused aluminum



J&L cold drawn ELECTRICWELD tubing with a superior SPECIAL SMOOTH I.D. finish

Cold drawn ELECTRICWELD tubing with the superior smooth I.D. finish will cut your production costs in applications like these:

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- **hydraulic and pressure tubing**
- **shock absorbers**
- **ordnance components**

This new drawn-over-mandrel grade tubing with its mirror-like surface finish helps reduce or eliminate costly machining on many applications. For example, it may be used, without inside honing, for many cylinders through which plungers are passed.

ELECTRICWELD tubing withstands high internal hydrostatic pressures; carries heavy torsion loads; resists high-frequency vibration. It offers a favorable weight-to-strength ratio where loading occurs in all directions.

It is furnished in OD sizes from ½ inch to 2⅞ inches and in wall thickness from 20 to 10 gauge, 0.035 and 0.134 inch. Send coupon today for complete information.

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Dept. 404, 3 Gateway Center
Pittsburgh 30, Pennsylvania

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CHICAGO OFFICE: 332 South Michigan Avenue

NEW PRODUCTS and equipment

oxide abrasive which is metallurgically bonded to the aluminum plate.

Tread widths are 10 in. Lengths are 24 to 42 in. *Write*: Aluminum Co. of America, 1501 Alcoa Bldg., Pittsburgh 19, Pa. *Phone*: Atlantic 1-4545

Magnetic Conveyor

The delivery section extends beyond the base of this conveyor. It handles tote boxes that must be located as close as possible to the base of the conveyor.

The angle of incline can be adjusted so that the receiving end of the conveyor fits under the discharge chute of all standard presses. Material can be discharged into the center of tote boxes.

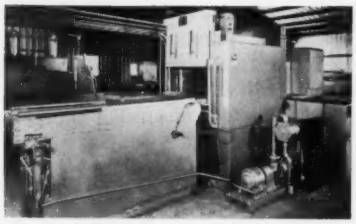
Material being conveyed to the discharge point is under full magnetic control. There is no chance of parts falling off or being thrown clear of the belt as they reach the top of the conveyor and start down the delivery extension. *Write*: Department 149, Homer Mfg. Co. Inc., Lima, O.

Automatic Furnace

Controlled temperatures up to 1850°F for hardening, carbonitriding and carburizing are provided by this furnace.

Loads up to 600 lb are charged

NEW PRODUCTS and equipment



automatically. Heating elements are placed on each side and under the load and the atmosphere is circulated by a high velocity fan. Quenching in oil is automatic.

Heating rates are 400 to 1200 lb an hour. *Write*: Pacific Scientific Co., Los Angeles, Calif. *Phone*: Andover 1-8303

Lift Truck

The G-3 line has models with 15,000, 16,500, 18,000 and 20,000 lb capacities. The trucks are powered with gasoline or LP gas and have pneumatic tires.

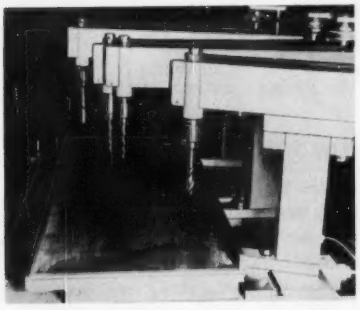
Widely spaced lift cylinders and nested channels are used to increase operator visibility. Chains for lifting power are in front of the lift cylinders. The operator sits high and in the center of the truck.

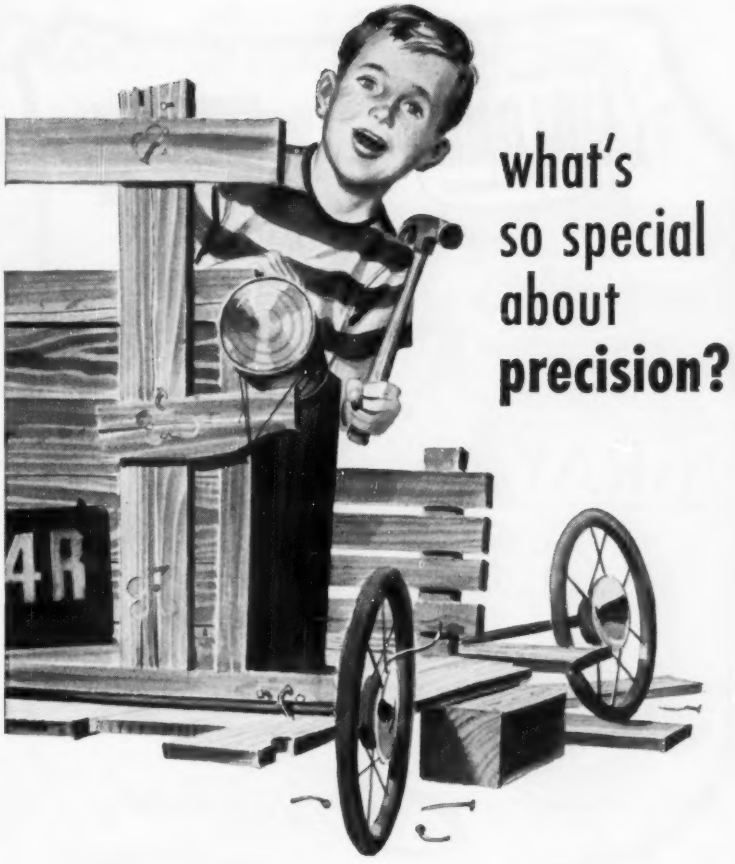
Lifting speeds of 65 fpm are provided by a dual hydraulic pump. Maximum travel speed is 20 mph. *Write*: Yale Materials Handling Division, Yale & Towne Mfg. Co., 11000 Roosevelt Blvd., Philadelphia 15, Pa. *Phone*: Orchard 3-1200

Drilling Machine

This multiple spindle machine comes in five models with working lengths of 4, 8, 12, 16 and 20 ft. Holes can be drilled within ½-in. of each other.

The basic 4-ft model has four in-





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5562-CH

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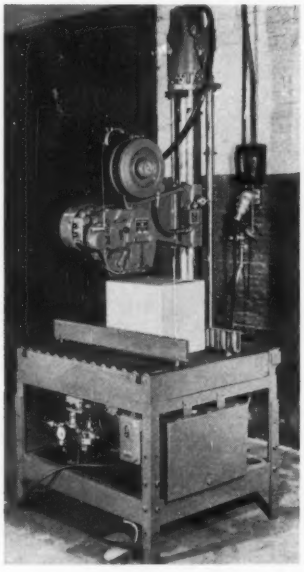
dividually adjustable heads. Each has an individual drive which supplies variable speeds (900 to 3600 rpm). Drill heads can be added to get any pattern of holes.

The worktable rises up to the spindles at 5 to 150 ipm. Work need not be centered on the table, and the machine is not affected by unbalanced loads. *Write*: ABM Machinery Corp., 29 Elm St., Mt. Vernon, N. Y.

Machine Closes Boxes

Model N6A17 Circuate Stitcher simultaneously seals the tops and bottoms of filled boxes. Each head drives 290 stitches a minute. Up to 700 average size boxes can be closed in an hour.



About 13,000 stitches can be made with a 25-lb coil of flat stitching wire. Average cost is 42 cents per 1000 stitches.

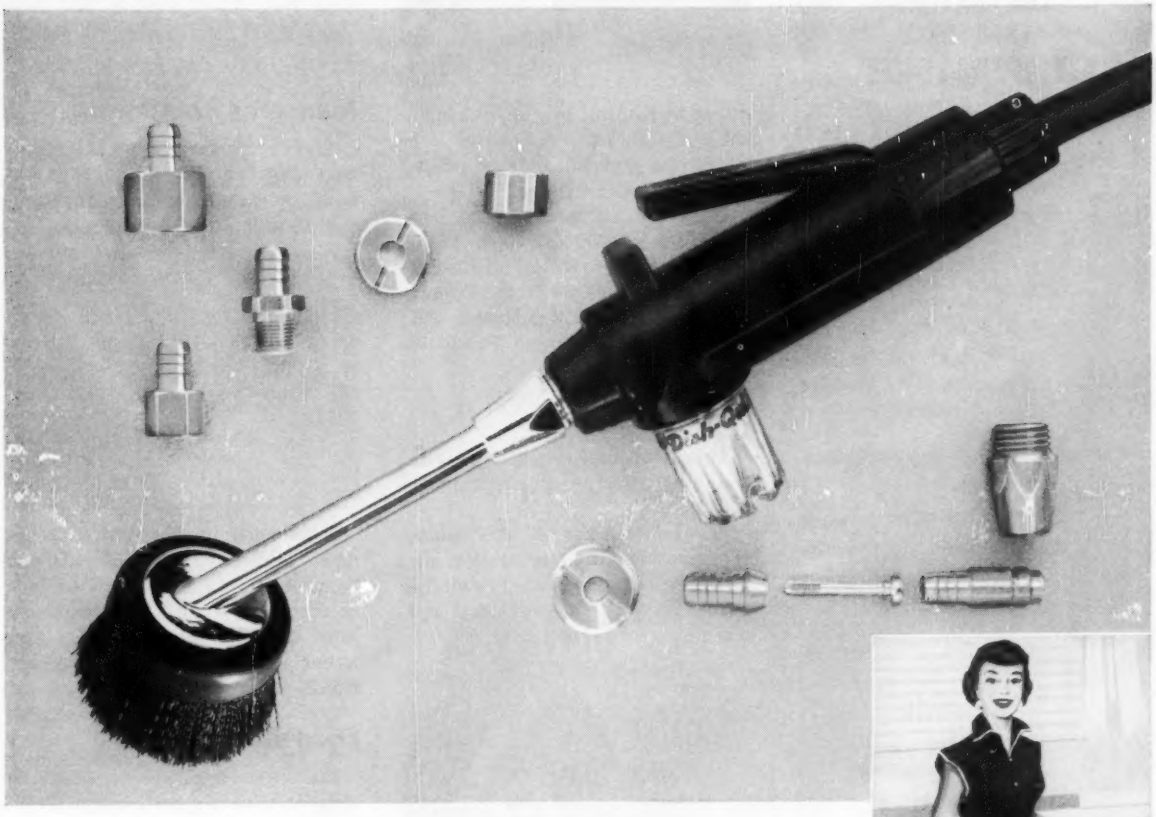
The machine will handle boxes from 4 x 4 in. to 26 in. wide x 24 in. deep. *Write*: Acme Steel Co., 135th & Perry Ave., Chicago 27, Ill. *Phone*: Interocean 8-9500

Yard Ramp Is Light

One man can move and position this magnesium ramp for freight car and truck loading. It is on semipneumatic tired wheels.

The upper end of the ramp is

Why *Dish-Quik*® uses Chase Free-Cutting Brass Rod!



"No other metal combines such production speed with quality results!"

HAROLD E. CONNELLY, *Purchasing Agent, Modern Faucet Mfg. Co.*

Housewives want economy and long-lasting dependability from their appliances — and the makers of Dish-Quik know it! That's why this beautifully-designed, labor-saving faucet attachment was fabricated from so much free-cutting Chase brass rod!

For one thing, using Chase free-cutting brass rod assures Modern Faucet Mfg. Co. of highest production speed and top-quality work. What's more, parts made from this tough, corrosion-resistant rod won't clog with rust from their daily contact with hot and cold water. They shrug off hard knocks that are part of frequent use.

The end result? A de-luxe product made to give more *value* to consumers — at the lowest *cost* to the manufacturer!

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NEW PRODUCTS and equipment

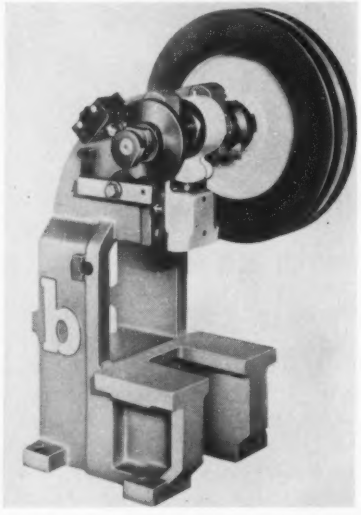
raised to loading height by a manual hydraulic lift. A positive locking device prevents it from pulling away from the carrier.

They are 30 ft long and have capacities of 6000, 10,000, 12,000 and 16,000 lb. *Write*: Lite-Line Metal Industries Division, Copperloy Corp., 4105 Brookpark Rd., Cleveland, O. *Phone*: Shadyside 9-0430

Fixed Bed Press

This 2-ton unit has a mechanical clutch actuated by an electric solenoid.

On the left end of the spindle is a positive, single-revolution stop and two cam operated switches which prevent the electrical system from double tripping.



The gap frame press operates at 280 to 290 strokes a minute. Standard stroke is ¾-in. *Write*: Benchmaster Mfg. Co., 1835 W. Rosecrans, Gardena, Calif. *Phone*: Plymouth 6-8134

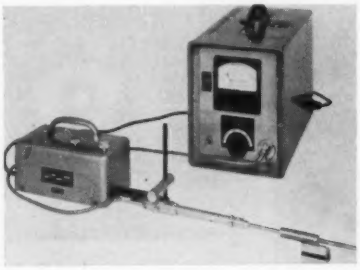
Dry Acid

Rust, scale and corrosion are removed by Drycid, a powdered material used in concentrations up to 8 ounces per gallon of water. It is used for immersion and circulation applications.

Solutions may be used cold, or heated up to 165°F for faster action. The material goes into solution quickly. *Write*: Oakite Products Inc., 134E Rector St., New York 6, N. Y. *Phone*: Whitehall 3-0940

Measures Roughness

The Profilometer Type LC Tracer measures surface roughness in holes as small as ¼-in. in diameter to a depth of 6 in.



It is used on internal and external surfaces where the part can be measured with the work surface horizontal. *Write*: Micrometrical Mfg. Co., 345 S. Main St., Ann Arbor, Mich. *Phone*: Normandy 2-5626

Enameling Oven

Coatings applied to metallic strip or wire can be baked or dried in this oven. Its heat pattern can be varied by the interchange of heat inserts.

Standard oven sections can operate on fuel gas or electricity.

The oven comes in six sizes, based on effective heating width, and can be arranged in combinations covering nominal heating capacities up to 500 lb an hour.

A new annealing oven can be used with the oven or separately. It handles round and rectangular wire, tubing and strip. *Write*: General Electric Co., Schenectady 5, N. Y. *Phone*: Franklin 4-2211

Metal Coating

A combination of foil, plastic film and paper makes up this protective covering for fine metal finishes. It is resistant to rain, sleet, sand, smoke and handling, shipping and storage hazards. *Write*: Onco Products Inc., 201 S. Main St., Middletown, O. *Phone*: Garden 2-2151

NEW Literature

Write directly to the company for a copy

Information on Metals

Uses and properties of zirconium and hafnium are covered in this 12-page bulletin. U.S. Industrial Chemicals Co., division of National Distillers Products Corp., 99 Park Ave., New York 16, N. Y.

Sealant

A material that seals joints and pores in metals and locks threaded fasteners is described in a 4-page bulletin. American Sealants Co., 103 Woodbine St., Hartford 6, Conn.

Big Portable Drill

An 8-page bulletin describes a portable tool for drilling, reaming or countersinking holes 2½-in. and larger. Guibert Steel Co., P.O. Box 4342, Pittsburgh 4, Pa.

Magnetic Chucks

Bulletin 257, 28 pages, covers a line of magnetic chucks, holding devices and accessories. Hanchett Magna-Lock Corp., 382 Maple St., Big Rapids, Mich.

Stainless Fittings

Corrosion-resistant fittings that can be used with slip-on or insert flanges are covered in a 22-page bulletin. Horace T. Potts Co., Erie Ave. & D St., Philadelphia 34, Pa.

Welding Cable

A 4-page bulletin describes features of power and welding cable. Paranite Wire & Cable Division, Essex Wire Corp., Ft. Wayne 6, Ind.

Piping Systems

Colors and letters used to identify piping systems are depicted in bulletin 117. Rust-Oleum Corp., 2799 Oakton St., Evanston, Ill.

Pyrometer Controls

Bulletin AC-2, 16 pages, describes package controls for chemical and mechanical functions that can be measured electrically. Tipp-Tronic Inc., Tipp City, O.

Heat Treating Furnaces

Hardening, preheat, high speed, tempering and vertical furnaces are described in bulletin 416, 12 pages. C. I. Hayes Inc., 800 Wellington Ave., Cranston 10, R. I.

Welding Control

Nonsynchronous controls for single or multiple impulse welding, spot, projection, flash and butt, are discussed in bulletin GEA-6408, 12 pages. General Electric Co., Schenectady 5, N. Y.

Worm Gear Drives

Bulletin 145, 16 pages, covers special units, speed reducers and worm gear drives and their application to mechanical power transmission. Cleveland Worm & Gear Co., 3249 E. 80th St., Cleveland 4, O.

Milling Cutters

Bulletin FM-27, 4 pages, describes a line of carbide face mills with integral shanks. Niagara Cutter Division, Bollier-Damerell Inc., 330 Niagara St., North Tonawanda, N. Y.

Movable Cranes

A line of cranes with capacities of ½ to 3 tons is covered in this 4-page bulletin. Tubar Crane Division, Uhrden Inc., Dennison, O.

Material Handling

Case histories showing how to cut handling costs with the use of welded wire mesh containers and pallets are covered in this 34-page report. Pittsburgh Steel Products, a division of

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BY YEARS OF HARD EVERYDAY USE IN THOUSANDS OF PLANTS

instant automatic flow and shut-off
quick connection and disconnection
leak-proof minimum wear locking device
integral factory assembled tamper-proof socket head

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ONE-WAY SHUT-OFF

Locking pins in Hansen Push-Tite Coupling Socket afford large area contact with Plug, thereby preventing wear and subsequent leakage.

The ability of Hansen Push-Tite Couplings to withstand severe service—with practically no maintenance—has been thoroughly proved by years of hard, everyday use in thousands of plants. The "socket head", which contains the locking device, is factory assembled into a rugged integral unit which cannot be readily injured or have component parts lost by casual tampering.

To connect the Coupling, you merely push the Plug into the Socket with one hand. Flow is instantaneous. To disconnect, push back sleeve on Socket—Coupling disconnects. Flow is shut off instantly and automatically.

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NEW LITERATURE

Pittsburgh Steel Co., Grant Bldg., Pittsburgh 30, Pa.

Titanium Pipe

Seamless titanium pipe and tubing for corrosive environments are described in bulletin TDC-185, 12 pages. A 4-page bulletin, TDC-138, lists dimensions and specifications of carbon, alloy and stainless steel pipe used for high temperature and high pressure service. Tubular Products Division, Babcock & Wilcox Co., Beaver Falls, Pa.

Precision Lathe

Bulletin 504, 20 pages, describes a lathe for production and toolroom use. It has variable spindle speeds up to 2000 rpm. Monarch Machine Tool Co., Sidney, O.

Switches and Controls

Remote control switches for power and lighting are covered in catalog 57-S2, 38 pages. Contactors for power circuit control for all classes of loads are described in catalog 57-S3, 32 pages. Catalog 57-S4, 46 pages, covers relays for circuit or load control. Alternating and direct current solenoids are presented in catalog 57-S5, 16 pages. Automatic Switch Co., 50-56 Hanover Rd., Florham Park, N. J.

Stud Welding

This 24-page bulletin for design engineers covers properties and selection of studs. Nelson Stud Welding Division, Gregory Industries Inc., Lorain, O.

Induction Heating

Motor-generator sets and accessories for induction heating are described in bulletin DB28-750, 8 pages. Westinghouse Electric Corp., P. O. Box 2099, Pittsburgh 30, Pa.

Air Filtering

Bulletin 780, 4 pages, describes the adaptation of air filtration to heating and ventilating units, industrial heaters, unit ventilators and air conditioners. Department PD, American Air Filter Co. Inc., 215 Central Ave., Louisville 8, Ky.

Corrosion Resistance

Uses of impervious graphite and resin base cements are described in bulletin S-5050, 4 pages, National Carbon Co., a division of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.

Welding Positioners

Bulletin SU57, 8 pages, describes positioners with capacities of 75 to 500 lb. Aronson Machine Co., Arcade, N. Y.

Heavy Duty Switches

Precision switches for machine tools and other industrial equipment are covered in this 8-page bulletin. Micro Switch Division, Minneapolis-Honeywell Regulator Co., Freeport, Ill.

Collets and Feeders

Bulletin 22, 24 pages, discusses the solution of collet and feeder problems. Sutton Tool Co., Sturgis, Mich.

High Strength Steel

A manganese-copper steel that resists abrasion and fatigue is described in bulletin 733, 4 pages. Republic Steel Corp., 3100 E. 45th St., Cleveland 27, O.

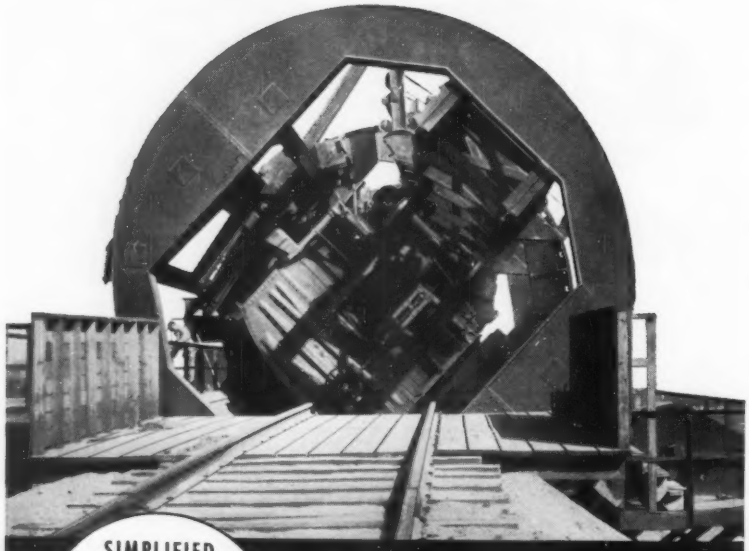
Lubrication Fittings

Catalog 38-23, 32 pages, presents standard and special fittings and accessories. Alemite Division, Stewart-Warner Corp., 1826 Diversey Pkwy., Chicago 14, Ill.

Hydraulic Cylinders

This 16-page bulletin describes cylinders for air or oil service. An 18-page bulletin presents dos and don'ts

TILT
180 Degrees



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Poland, Ohio

■ Write for Bulletin 200

for air and hydraulic equipment. Logansport Machine Co. Inc., Logansport, Ind.

Air Grinders

This 4-page bulletin describes small wheel grinders. Rotor Tool Co., 26300 Lakeland Blvd., Cleveland 32, O.

Gas Regulators

Bulletin 1024-6, 8 pages, describes high pressure regulators that will withstand momentary overloads as high as 1000 psi on the outlet side. Meter & Valve Division, Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.

NEW BOOKS

Technical Data on Plastics, Fifth Edition, Manufacturing Chemists' Association Inc., 1625 Eye St. N.W., Washington 6, D. C. 224 pages, $3.25.
Graphical and tabular data on fabrication, durability, electrical, mechanical and other properties of 25 types of plastic materials are presented.

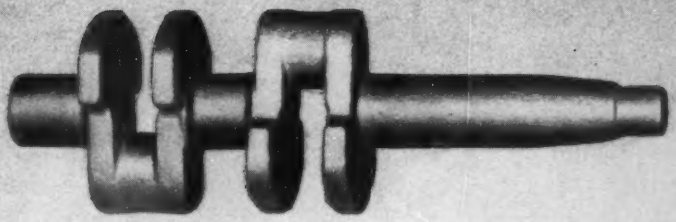
Procedure Handbook of Arc Welding Design and Practice. 11th Edition, Lincoln Electric Co., Cleveland 17, O. 1300 pages, $3.
The eight sections in this reference book cover history, nomenclature and processes, weldability, mild steel procedures, manufacturing cost data, machine design, structural design, applications and reference data.

Symposium on Solder. American Society for Testing Materials, Philadelphia 3, Pa. 190 pages, $3.
This volume covers the manual, mechanized and ultrasonic techniques of soldering and emphasizes the role of standardization in solder technology. It evaluates fluxes, solder alloys and solderability in numerical terms.

Control of Steel Construction to Avoid Brittle Failure. American Welding Society, 33 W. 39th St., New York 18, N. Y. $4.50.
The manual analyzes studies of the notch sensitive properties of structural steel and summarizes available information and data in design and construction. It is divided into three parts: Materials, fabrication and design. A summary and glossary are included.

How often do you find a flaw in a coin?

...or in a FORGING?



(Both are made by the same basic process)

When closed impression dies strike a coin, or hammer out a forging, they produce a result that gives specific advantages — **freedom from concealed flaws, closeness to tolerance, strength without bulk, superior resistance to impact and fatigue stresses.** These advantages mean fewer part rejects, greater overall economy, better product dependability and performance. These advantages are all found in forgings, **the metal you can trust.**

Do you have a part design problem? Are you now purchasing parts, made by other processes, which require extra metal to provide strength? Are you using weldments, or fabricated assemblies? You will find that often forgings can eliminate extras, and yet give you quality-plus advantages.

Make it a point to call in a forging engineer to learn more about how up-to-date methods and techniques of forging can help to reduce your products or part cost.

Reduce your cost by using forgings. Send for booklets, ☐ "What is a Forging?" and ☐ "Management Guide to the Use of Forgings."

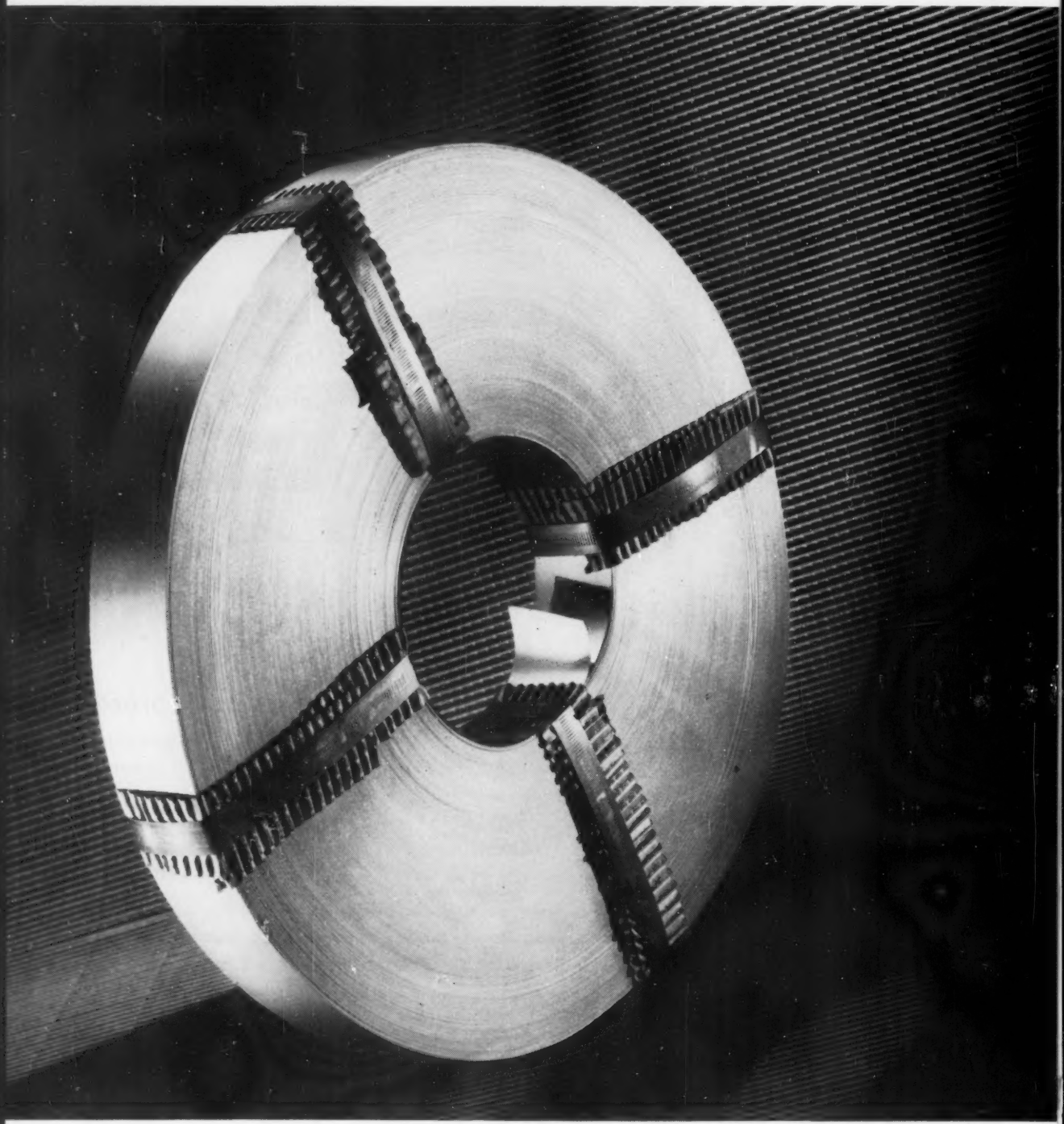
closed-die **forgings** for metal you can trust

DROP FORGING ASSOCIATION

Dept. S, 419 S. Walnut St., Lansing, Mich.

Symbolic emblem of the Drop Forging Association

CMP RESTRICTED SPECIFICATION COLD ROLLED STRIP STEEL



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CMP

Market Outlook

STEEL PRODUCTION went below 90 per cent of capacity for the first time in a nonstrike, nonholiday week since 1955. The latest figure, 88.5 per cent in the week ended May 5, was 1.5 points below the preceding week's level. The reduced rate yields 2,265,000 net tons of steel for ingots and castings—the lowest tonnage for a nonholiday, nonstrike week since September, 1955.

On last year's lower capacity, this would have given an operating rate of 92 per cent.

THE CAUSE—The lowered rate reflects reduced demand for steel. Consumption, although down in some lines, reached a high total overall, but needs can be supplied with relative ease. The country's steelmaking capacity is larger than ever before, and there should be no interruptions in operations this year.

DECEIVING—The current operating rate is possibly slightly below the rate of consumption because many steel consumers are using up their inventories. With most forms of steel easy to get, users see no reason to keep large stocks on hand. Their inclination to reduce inventories will be tempered, though, by the expectation of price increases at midyear.

ON ALL FRONTS—Even products like heavy plates, structurals and oil country tubular goods are a little nearer to balance in supply-demand. A major producer says there is some sign that the supply of oil country tubular goods will match demand in the third quarter.

Reduced needs of the construction industry have taken a little of the pressure off heavy plates, but shipyard requirements are rising. Added to this is the heavy consumption by makers of line pipe, railroad freight cars and heavy industrial equipment.

Improving the supply of heavy plates is the return of Bethlehem Steel Co.'s Sparrows Point, Md., mill to plate production. A new mill enlarges the plant's annual capacity for plates by 400,000 tons.

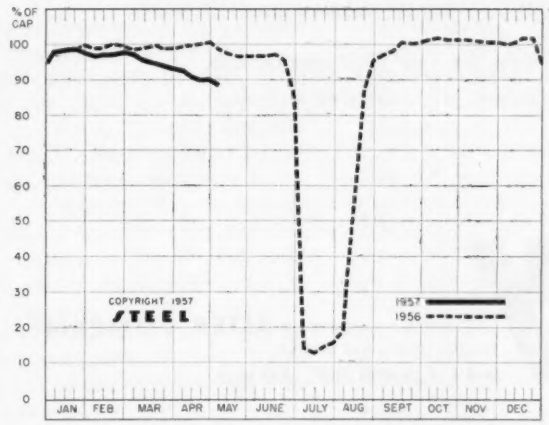
DEMAND—Hot-rolled carbon steel sheets are in more active demand than cold rolled. Heavy electrical equipment is maintaining a strong demand for high silicon sheets. One producer of such sheets is booked fully through July, and has a considerable volume of orders for September delivery. Low silicon sheets remain in easy supply because of a lag in household appliances requiring small motors.

HIGHER—A 4.5 per cent increase in tin mill products on Apr. 30 pushed STEEL's price composite on finished steel to $140.24 a net ton in the week ended May 1. This is a 53-cent rise.

In contrast, prices of steel imported from Europe have declined because of the reduced demand for it here. Reductions per 100 lb are: 16 cents on bar size angles, 20 cents on merchant bars, 15 cents on channels, 20 cents on structural angles and 5 cents on nails. Barbed wire is down 10 cents a reel. The declines would have been sharper if demand in Europe and some other world markets had not been good.

SCRAP RISES—For the first time this year, a rise was recorded in the price of steelmaking scrap. The turnabout in the price trend raised STEEL's price average $1.17 a gross ton in the week ended May 1. The new figure is $43.67.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended May 5	Change	Same Week 1956	Same Week 1955
Pittsburgh	94	+ 2	100.5	99.5
Chicago	88	+ 1*	98	99
Mid-Atlantic	96	0	99	96.5
Youngstown	86	— 4	97	98
Wheeling	90	— 4	103	95.5
Cleveland	83	— 3.5*	93	100.5
Buffalo	95	+ 2.5	105	104.5
Birmingham	95.5	0	23.5	93.5
New England	56	— 2	88	88
Cincinnati	60	— 5	93	93.5
St. Louis	90	— 4	94	106.5
Detroit	92	— 4.5	99.5	91.5
Western	100	— 3	109	96
National Rate	88.5	— 1.5	98.5	96.5

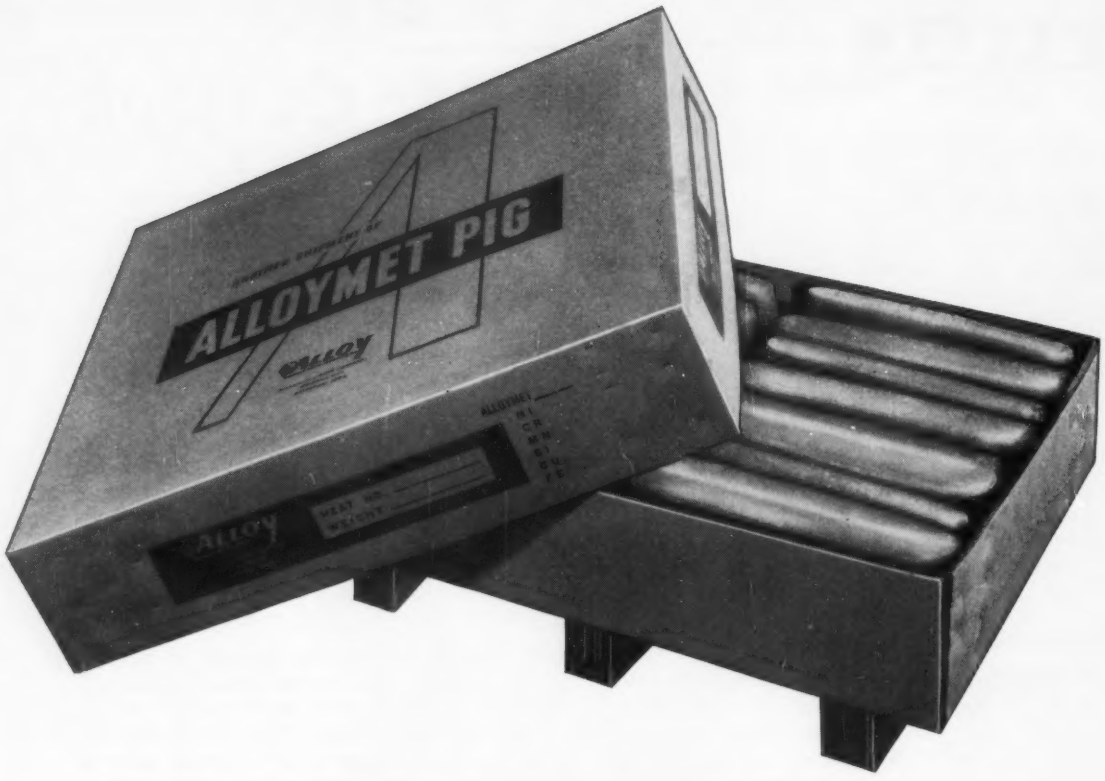
INGOT PRODUCTION‡

	Week Ended May 5	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	141.8†	141.2	144.4	147.7
NET TONS (In thousands)	2,278†	2,269	2,319	2,373

*Change from preceding week's revised rate.
†Estimated. ‡Amer. Iron & Steel Institute.
Weekly capacity (net tons): 2,559,490 in 1957; 2,461,893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 45

Technical Outlook—p. 83



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Steel Inventory Aim: 30-60 Days

(Per cent of respondents)

Arrows show dominant trends since STEEL's last report.

	Less than 10 days	10-30 days	30-60 days	60-90 days	3-6 months
Hot-rolled carbon bars	1 —	16 →	52	22	9
Cold-finished bars	0	30	43 ←	21 —	6
Hot & cold-rolled sheets, strip	3	13	53 ←	23	8
Light plates	5 —	16 →	47	23	9
Heavy plates	12	25 —	47 →	12	4
Structural shapes	9	25 →	51 ←	11 —	4

Legend: Inventories of average metal user in white block.

Inventories To Hold Steady

Expectations: Some build-up in heavy plates along with moderate reductions in easy-to-get items. Look for more users to move stocks into the 30 to 60 day category

STEEL INVENTORIES will show little change in the next three months, reveals STEEL's latest quarterly survey of stocks.

Ninety days from now, 56 per cent of the users say stocks will be the same; 32 per cent see a reduction; and 12 per cent predict a rise. In STEEL's previous survey (Feb. 4, p. 149), 48 per cent predicted stocks would remain the same; 30 per cent thought they would be lower; and 22 per cent said they would be higher.

Move—The shift in inventories in the last three months has been into the 30 to 60 day category (see table). An average of 49 per cent of steel users' stocks now fall into this group. This compares with 40 per cent three months ago.

The pickup in the 30 to 60 day group came from reductions in both the higher and lower categories. Fewer users now hold inventories of under 30 days. Stocks of three to six months are also less common.

Buyers say the biggest inventory reductions in the next three months will be in hot and cold-rolled sheets and strip, light plates and hot-rolled carbon bars. The greatest increase is expected in heavy plates.

A few respondents report they hold higher than desired inventories of hot-rolled carbon bars (6 per cent); hot-rolled sheets and strip (5 per cent); and light plates (5 per cent). Other inventories mentioned as being in excess include: Hot-rolled alloy bars, galvanized sheets, seamless tubing and stainless sheets and strip.

Faster — Deliveries have improved: 94 per cent of the respondents find deliveries generally adequate; only 6 per cent have major complaints. One Oklahoma firm remarks: "We have never had it this good."

Heavy plates still give 20 per cent of the users the most trouble on deliveries, followed by standard structurals (14 per cent) and wide flange beams (5 per cent).

A slight easing is seen in heavy plates and standard structurals. Heavy plates are becoming easier to get; users are trying to build up inventories to protect against being caught short.

Structurals, still in tight supply, have loosened considerably in the last three months. A few users are reducing inventories. Says a Texas firm: "At this time, structurals are much easier to get. We have little trouble on deliveries."

The wide flange beam situation is not so bright. Indications are they will continue to be in tight supply for some time. Says one Virginia user: "Reduction in our inventory of wide flange beams is unavoidable. We just can't get enough."

Copper, Aluminum—Buyers plan to make little change in inventories in the next 90 days. About 50 per cent are maintaining 30 to 60 day stocks; around 30 per cent have 10 to 30 day supplies.

Some 71 per cent of the copper users and 76 per cent of the aluminum users believe stocks will hold steady. Only 23 per cent plan to reduce copper stocks, 19 per cent aluminum. Higher copper inventories are seen by 6 per cent; 5 per cent believe aluminum supplies will rise.

Outlook—Don't look for a drastic change in inventories in the immediate future. Producers want to keep stocks at a safe, workable minimum. There is a trend to build up stocks of such hard-to-get items as heavy plates and wide flange beams. Materials in good supply may be subject to slight reductions.

Imported Steel Prices Slip

Prices on imported steel from Europe have eased on channels, structural angles, bar size angles, merchant bars, hot-rolled bands, barbed wire and nails. There is no change in wire rod prices. All other prices are steady.

Over-all, demand for European steel is easier, reflecting, in part, the freer supply of domestic material. Prices on European steel have not dipped more sharply, or more generally, because of continued good demand in Europe and other areas of the world market.

European deliveries to this country continue about the same—60

to 90 days for deformed bars, I-beams and plates. Deliveries on merchant bars and hot rolled bands average around 60 days, hot and cold sheets 30 days and channels 30 days. Shipments on wire products average around 45 days.

Alloy Steel . . .

New extra cards for hot-rolled alloy and special steels—blooms, billets and slabs, bars and spring sizes—will be issued by Republic Steel Corp., Cleveland. They will contain a complete list of standard, tentative standard and boron grades, together with applicable grade extras.

Grades no longer considered as standard or tentative standard have been deleted from the extra card. Orders on the books will be produced as entered, but those received after Apr. 29 will be classified as "other than standard," and will be subject to applicable chemistry ranges for such grades.

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Tin Plate . . .

Tin Plate Prices, Page 135

Tin plate consumers exerted top pressure on producers for the shipment of tonnage prior to the scheduled increase of 35 cents per base box on Apr. 30. But mills still have more tonnage than they can handle over the remainder of this quarter. Shipments in May and June may not be quite as high as those in April, but there appears to be no question that production will remain at capacity.

Major producers say increased prices are having no effect on demand for May and June. Requirements for this year's canning season are as high as ever. There is a possibility that the canners may reduce inventories late this year, but for the remainder of the second quarter, all producers anticipate heavy sales. The third quarter may see some inventory reduction, but the outlook is for a sales increase later in the year.

Reflecting the increase in domestic prices on tin mill products, export quotations have been advanced. The U.S. Steel Export Co. announced increases effective concurrently with changes in domestic prices.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 138 & 139

With hot and cold-rolled sheet deliveries freely available in June, and with some tonnage still to be had for May shipment, the market for light, flat-rolled products continues slow. There are some indications that specifications for this month and June may be a shade better than those in April. There is a little more spot buying for inventory, and hedge buying against higher prices this summer is more in evidence.

Except for high silicon sheets, producers still have tonnage available for delivery this quarter. Shipments of hot and cold-rolled can be had within four to five weeks in some cases. Hot sheets continue more active than cold rolled, with the heavy gages of hot rolled in best demand.

Galvanized and most sheet specialties appear to be doing well, even though the seasonal upturn

has not been up to expectations. Demand for high silicon sheets reflects active requirements for heavy electrical equipment. One producer has nothing to offer before August and has considerable business booked through September. Low silicon sheets remain in easy supply, owing mainly to the lag in household appliances requiring fractional horsepower motors.

The lag in appliances and sanitaryware—all reflecting in a measure slow housing starts—is also restricting the movement of enameling stock. An eastern seller estimates sales are off 40 per cent from those of a year ago. But some manufacturers of appliances are increasing requirements by diversifying their operations, going into activities such as the fabrication of curtain walls.

Some producers of cold-rolled sheets are taking orders for the third quarter, but results so far are not too encouraging. Expectations are the auto builders will have to resume active buying in August if they wish to get into production quickly on 1958 models.

Midwestern sheet mills do not look for much additional business from the auto and appliance industries this quarter. Third quarter volume will likely fall below that of the second quarter.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 137

While bridge tonnage is down, reinforcing bar contracts are sustained by heavy engineering work, schools and buildings redesigned for concrete construction. Availability of tonnage and prompt shipments are maintaining volume. Some industrial and commercial projects are going to reinforced concrete after structural steel estimates quote deliveries beyond completion deadlines. For these projects, concrete bars are available.

Buying of mat reinforcement is below expectations, although some states provide payment to contractors for early deliveries. Few take advantage of this because of delays in the highway programs. American Steel & Wire Division, U.S. Steel Corp., will supply 665 tons for the Connecticut turnpike at Old Lyme, Conn.

Three Washington state highway jobs, involving 400 tons of reinforcing bars, were opened last week. Highway construction in Oregon is absorbing a sizable volume of bars.

Warehouse . . .

Warehouse Prices, Page 142

The traditional spring upturn in sales is beginning to appear at some warehouses, but it is not reflected in all products. Order volume in the first quarter was off slightly from that in the like period last year, but total tonnage compared well with that of other recent years.

Merchant wire sales are poor. Sheet demand for air-conditioning applications and farm construction is heavy. Distributors of flat-rolled products say demand is much better than it was in the first three months, though it continues to trail last year's volume. Competition for orders is keen.

Plates and wide flange sections remain scarce. Light standard

Now equipped with a new and larger Onan 12.9 hp engine, the new Miller AEA-200-L produces a full 225 amperes of continuous rated, high cycle welding current or, 5 KW of 110/220 ac power for operation of power tools, lights, milking machines, etc., or, 1 KW of dc power.

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shapes are in somewhat freer supply.

Distributors have substantial inventories of bars and are reducing their receipts from the mills for the second quarter. This product category is the slowest of all, say some sellers.

In the Pacific Northwest, warehouse business was hit by a metal trades strike last month. The dispute appears to be settled, and shop activity is expected to be resumed quickly.

Steel Bars . . .

Bar Prices, Page 137

Although production and shipment figures for hot-rolled carbon bars are not off as much as those for sheets, the pattern is about the same in both markets. There is slight improvement in farm implement output, and miscellaneous business is better.

Some barmakers expect to operate their facilities at 100 per cent this quarter. Two things make this possible. They can make more reinforcing bars—which are in strong demand, and they can roll more bar shapes. Demand still exceeds their production.

On the whole, hot carbon bar business shows mild improvement, with producers still having substantial tonnage available for shipment before the end of this quarter. Prospects are that business will show little important gain over the remainder of the period and will continue to lag through the vacation months.

Bar supplies (all sizes and specifications) are adequate for all requirements. It is possible that the larger sizes of hot bars are in a little better demand than other sizes, but there is no suggestion of stringency. Mills still have ample space in their June schedules. Cold-finished bars are in excess supply.

Some consumers who have been holding out of the market are reported to be ordering for June delivery. This rising interest is attributed to a desire to build up stocks before an expected summer price increase goes into effect. Virtually all mills are booking orders for the third quarter, but consumers are slow to place tonnage for that period.

Connors Steel Division, H. K. Porter Company Inc., Birmingham, has added ten sizes to its standard production of cold-drawn bars for the warehouse trade. This raises the number to 42. Connors produces cold-drawn rounds in this range: ½ to 3.5 in. in diameter.

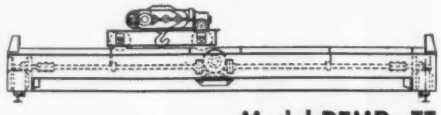
Wire . . .

Wire Prices, Pages 139 & 140

Demand for wire products shows little improvement. Merchant wire is moving more slowly than anticipated, and manufacturers wire trade continues spotty. Spring and heading wire grades are sluggish. Rod volume is off.

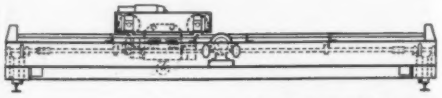
Some consumers have reduced inventories to 20-30 days, and they are buying on the basis of two-week delivery on numerous grades. A pickup in ordering in anticipation of higher prices this summer is expected this month. This may be too late for some mills to reschedule their production for shipment of heavy tonnage in June.

STANDARD HEADROOM
Provides highest hook height with top-running trolley and foot mounted hoisting unit.



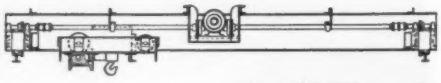
Model DTMD—TT

MEDIUM HEADROOM
Here the hoisting unit is rigidly suspended from the top-running trolley to reduce clearance over rail.



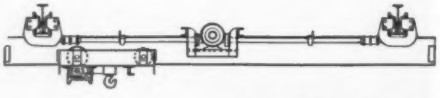
Model DTMD—LT

LOW HEADROOM
Under-running trolley permits unusually high hook lift. Use it where clearance under bridge must be maximum.



Model DTMD—UT

SUSPENDED TRACK
Operates on lower flange of crane runway suspended from roof guiders or other overhead support. Use also where load transfer is desired.



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They are not likely to go to overtime to get out volume in this category.

Currently, wire operations are 25 to 30 points under the over-all steel industry rate.

Nonintegrated mills in New England are well stocked, and semi-finished output is reduced accordingly.

Midwestern wiremakers say that the anticipated pickup in merchant wire sales, particularly fencing, is being delayed by recent heavy rains. Before that, cold weather held down farm requirements.

Plates . . .

Plate Prices, Page 137

Construction companies and producers of line pipe will not be able to fill their heavy plate requirements in the second quarter, but they probably will get more steel early in the third quarter. Purchasing agents at Pittsburgh say they have had no extra offerings from mills for plates over 5/8-in. thick and over 90 in. wide for May and June delivery. Numerous offerings from other than mill sources are being received at lower asking prices.

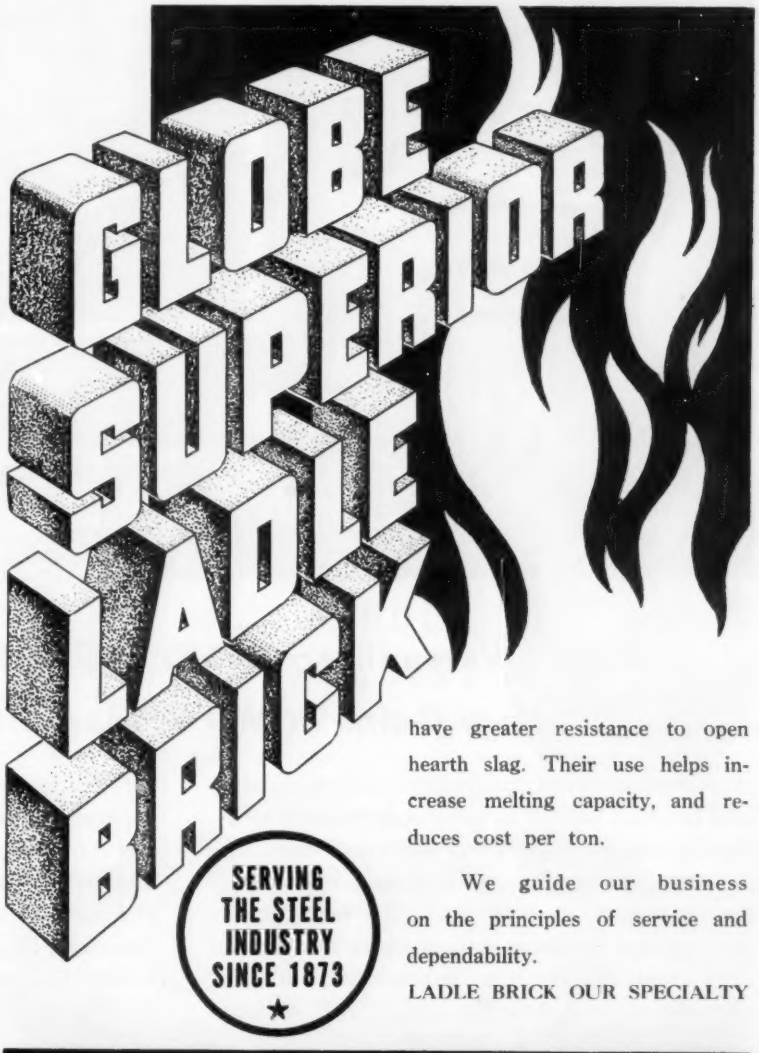
Midwestern plate sellers report shapes and heavy plates continue in top demand. A Chicago area mill states it could sell 50 per cent more structurals and 100 per cent more plates than it can produce. Light plates have moved into the easy supply category in the area, largely because more raw steel is being allocated for rolling into plates on strip mills.

While plate supply is a little easier, demand still exceeds available tonnage. Supply-demand balance still is not in sight, especially in view of the increasing requirements for ship construction. Line pipe, oil industry, railroad car, electrical and heavy industrial equipment needs continue strong. Construction demands are off a little, but are still heavy.

Contributing to the easier supply of sheared plate is the stepping up of production at Sparows Point, Md., where Bethlehem's new 160-in. mill got into production a few weeks ago. Output is back to where it was when the existing unit suspended early this year to permit conversion into a roughing mill for the new unit. The time required for conversion was less than anticipated. When running full speed, the new mill will increase sheared plate capacity at Sparrows Point about 400,000 tons annually—to 900,000 tons. Capacity for Bethlehem as a whole, including facilities at Johnstown, Pa., will be pushed up to 1,250,000 tons a year.

Continued active movement of strip is easing the over-all plate supply picture. Consumers who can use light gage narrow plates are not finding it too difficult to obtain tonnage. The flow of the strip mill product is taking some of the pressure off the regular plate mills, enabling them to devote more production to the heavier sheared product.

Sheared plate sellers, having opened books for the third quarter, report good specifications for that position. They anticipate all the tonnage they can handle and think pressure in the fourth quarter will



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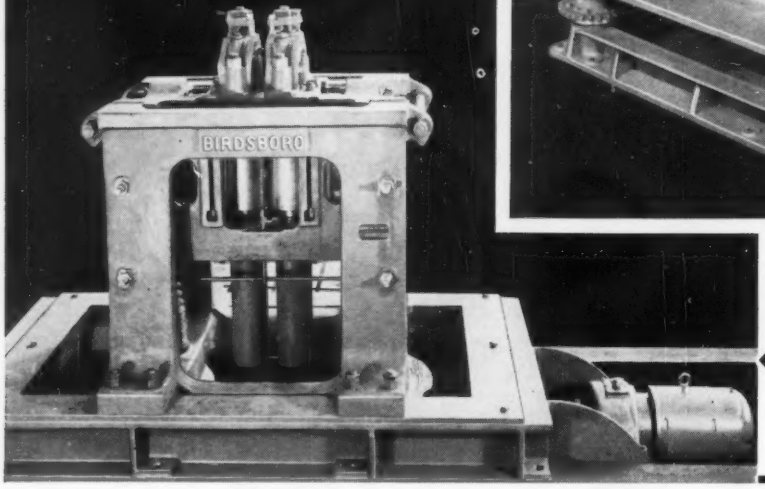

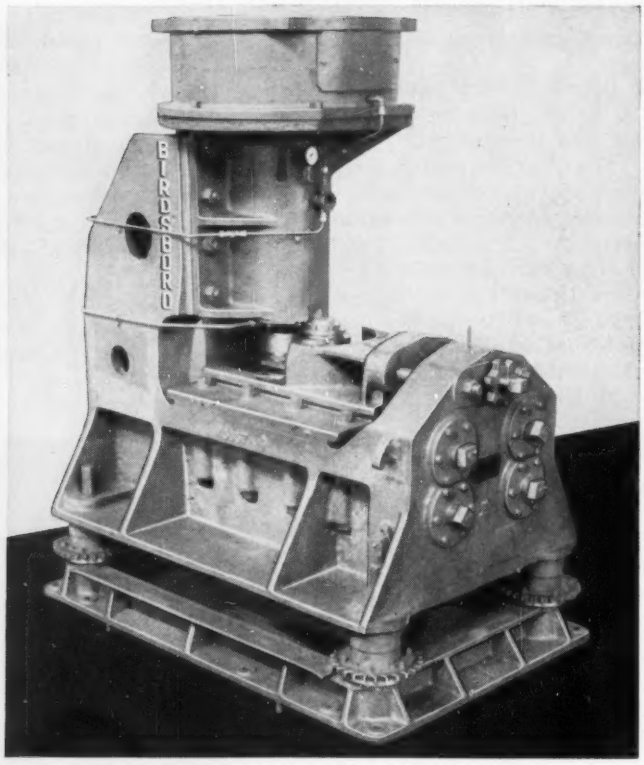

▲ VERTICAL MILL with twin motor drive, one motor above the other. Rolls are short sleeves.

◀ VERTICAL MILL with full length roll bodies driven by universal spindles from below. Pinion stand and bevel gear drive are located below the mill.

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be stronger than ever. Strip plate is less active for the third quarter than the heavier and wider sheared plate.

Shipyard backlogs are the heaviest they have been in the postwar period in New England. Plate supply is improving in the area. The bulk of hull plates will be lighter gages, 1 in. and under, although large tankers take heavier material. Because of width limitations, strip plate demand is restricted for ships. Bath Iron Works has a $130 million backlog, Navy contracts mostly. Ingalls Shipbuilding Co., Birminham, has a contract from the Maritime Commission for the first tourist class luxury liner ever constructed in this country.

Tubular Goods . . .

Tubular Goods Prices, Page 141

Evidence of an easing in supplies of oil country tubular goods is accumulating. Deep well casing is becoming more easy to obtain for third quarter shipment. Producers are taking third quarter orders for tubing and casing and expect to satisfy all the demands coming to them without difficulty.

Some consumers are cutting back orders for late third quarter because they expect to be approaching the end of their drilling season by that time. Since they think supplies will become increasingly freer from here on, they are likely to reduce their stocks before winter sets in. There is no shortage of orders for oil country goods, however, and expectations are the mills will continue to operate at capacity in the third quarter.

Buttweld pipe remains slow. Seamless pipe is in strong demand this quarter. Rising supplies of semifinished steel are enabling tubemakers to increase their production of small line pipe. Large line pipe still is held up by the shortage of heavy plates.

Producers of cast iron pipe and sanitaryware are operating well below capacity. A seasonal pickup in buying by municipalities is expected. On the West Coast, several important jobs are up for figures. The largest involves 700 tons for Mukilteo, Wash. The Pacific States Cast Iron Pipe Co. was awarded 740 tons by Tacoma.

Structural Shapes . . .

Structural Shape Prices, Page 137

Except for bridge work, demand for structural steel is not as active as anticipated. A heavy amount of miscellaneous work is in the planning stage, and a heavy movement of shapes continues. In March, and for the second month in a row, Bethlehem Steel Co. set a company record with production of 300,000 tons of shapes.

The movement of tonnage continues large. There are some indications, though, that an easing in requirements for standard shapes may be felt by the third quarter, possibly sooner. This is true even though the heavy volume of bridge work calls largely for standard structurals. No easing in supplies of wide flange sections appears to be in early prospect.

Fabricators not set up to do bridge work are finding it necessary to scratch for new business. In general, they are managing to keep busy, being helped to some extent by a reasonably good flow of school work. Currently, at least seven high schools are pending in the Philadelphia area, involving 200 to 500 tons each. Outstanding in the New York market are 13,500 tons for state bridge work. Gull Contracting Co., Flushing, N. Y., is low bidder.

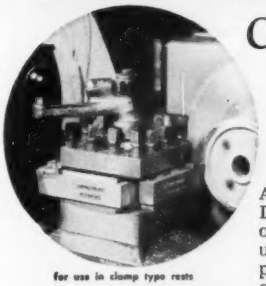
More structurals will be available to fabricators in the second half. Standard structurals about balance demand in some areas, and wide flange material deliveries are more nearly on schedule in New England, with indications that allotments will be increased in the months ahead.

New England shop bookings are off some, although commercial, industrial and school buildings hold up well despite high construction costs. Pending bridge volume in the area approximates 7000 tons, but contracts in the first four months were well below last year's

ARMSTRONG

Carbide Insert

TOOL HOLDERS



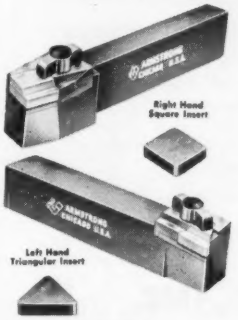
for use in clamp type rests

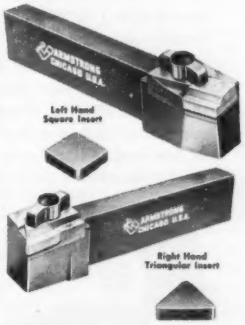
for use in conventional tool holders

ARMSTRONG Carbide Insert Tool Holders are of two types, (1) for use in conventional tool posts (2) for use with clamp rests.

Right-hand and left-hand tools for holding either triangular or square Armide "throw-away" inserts. Each style in a full range of sizes.

Carried in stock by leading Industrial Distributors everywhere. These efficient, economical tools end all tool grinding, save tooling-up time and cut costs.





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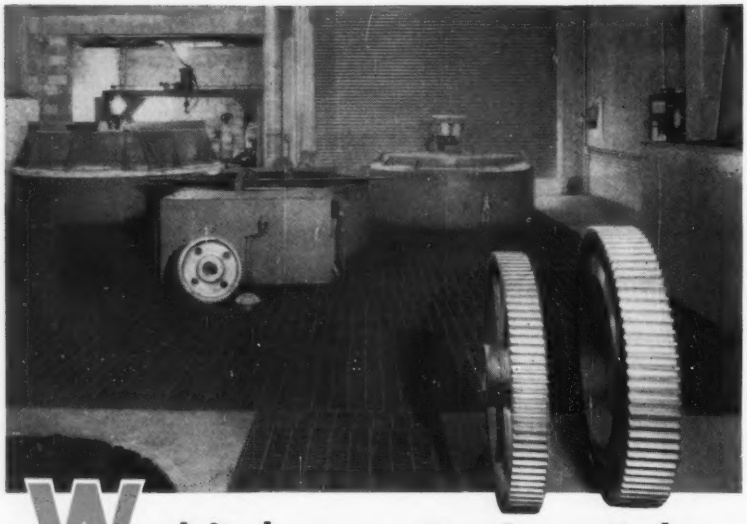


World's largest Radiant Tube Pit-type Carburizer installed at BRAD FOOTE

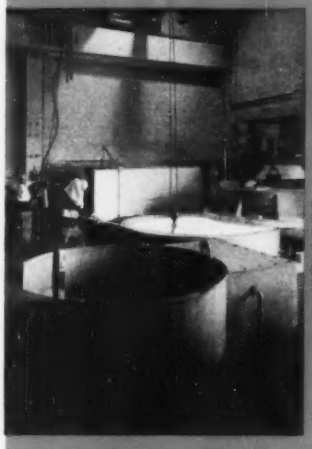
...more precise heat treatment for larger gears

• New heat-treating equipment, including the largest radiant tube pit-type gas carburizing furnace ever built, has recently been installed in the Pittsburgh plant of our subsidiary, Pittsburgh Gear Company. These new additions to BRAD FOOTE's extensive heat-treating equipment provide facilities for the most advanced techniques in deep case carburizing and hardening in controlled atmospheres.

• The new carburizer can handle gears or machine parts up to 6 feet long, 6 feet wide and up to 8500 pounds in weight. In addition to its size, the new equipment has an unusual ability to control carbon penetration, giving extremely precise control of the depth of surface hardening.

• Special heat-treating equipment, like this new carburizer, allows BRAD FOOTE to impart the precise metallurgical characteristics which make for longer wear, shock resistance and freedom from distortion in gears of all sizes and types. And BRAD FOOTE heat-treating is under the supervision of metallurgists with long experience in the special problems of the gear industry.

• Whether you want one gear or ten thousand, BRAD FOOTE's extensive facilities and specialized skills are at your disposal. Send us the specification on your next problem job for quotation. No obligation, of course.



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Phone: Lemont 920
Lemont, Illinois

PITTSBURGH GEAR COMPANY
Phone: SPalding 1-4600
Pittsburgh 25, Pennsylvania

awards, which included 70,000 tons for the Connecticut turnpike.

Pig Iron . . .

Pig Iron Prices, Page 142

Demand for merchant iron is spotty, reflecting an uneven order situation at foundries. In Chicago, light inquiry is attributed to generally reduced operations of gray iron and malleable foundries and the substantial drop in scrap prices in recent weeks.

In New York, demand has improved slightly because of a pickup in foundry operations. Over-all, requirements are the heaviest since late winter, when some protective covering developed against a pending price advance. Some sellers believe current business is a little better than it was then.

Buying interest in the Philadelphia merchant iron market is slack. Factors contributing to this situation: 1. Spotty jobbing foundry operations. 2. Producers of cast pipe and sanitaryware are operating well below capacity, with stocks of manufactured goods heavy.

Merchant iron is moving out of the Buffalo district by lake vessel at a rate somewhat below that of a year ago. With two blast furnaces returning to service at the Wickwire Spencer plant, pig iron production is moving back to full capacity. The two units at Wickwire Spencer had been down because of a seven-week strike.

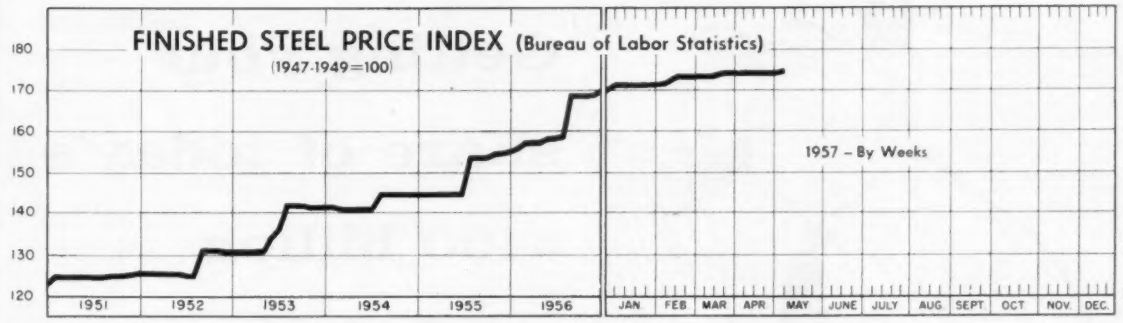
A reduction in pig iron output is in prospect at some Buffalo district mills because of reduced business or repair needs.

Rails, Cars . . .

Track Material Prices, Page 140

The Bessemer, Ala., plant of the Pullman-Standard Car Mfg. Co. has been awarded a $14.5 million contract by the Southern Railway System for construction of 1200 seventy-ton gondolas and 200 fifty-ton steel premium-type boxcars. This is in addition to an order for 2000 boxcars and 500 hoppers now being produced for the Southern. Construction on the new order is to begin in October, with completion expected early in 1958.

Price Indexes and Composites



Apr. 30, 1956	Week Ago	Month Ago	April Avg	Year Ago
174.5	174.0	174.0	174.0	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Apr. 30

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.350
Rails, Light, 40 lb	6.817
Tie Plates	6.275
Axles, Railway	9.400
Wheels, Freight Car, 33 in. (per wheel)	57.50
Plates, Carbon	5.900
Structural shapes	5.667
Bars, Tool Steel, Carbon (lb)	0.480
Bars, Tool Steel, Alloy, Oil Hardening Die (lb)	0.585
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274
Bars, Tool Steel, H.R., Alloy, High Speed, W18 Cr 4, V 1 (lb)	1.769
Bars, H.R., Alloy	10.150
Bars, H.R. Stainless, 303 (lb)	0.508
Bars, H.R., Carbon	6.075
Bars, Reinforcing	5.788
Bars, C.F., Carbon	9.910
Bars, C.F., Alloy	13.425
Bars, C.F., Stainless, 302 (lb)	0.533
Sheets, H.R., Carbon	5.945
Sheets, C.R., Carbon	6.789
Sheets, Galvanized	8.220
Sheets, C.R., Stainless, 302 (lb)	0.660
Sheets, Electrical	11.225
Strip, C.R., Carbon	8.843
Strip, C.R., Stainless, 430 (lb)	0.475
Strip, H.R., Carbon	6.000
Pipe, Black, Buttweld (100 ft)	18.894
Pipe, Galv., Buttweld (100 ft)	23.034
Pipe, Line (100 ft)	190.108
Casing, Oil Well, Carbon (100 ft)	185.566
Casing, Oil Well, Alloy (100 ft)	288.980
Tubes, Boiler (100 ft)	46.737
Tubing, Mechanical, Carbon (100 ft)	23.713
Tubing, Mechanical, Stainless, 304 (100 ft)	197.663
Tin Plate, Hot-dipped, 1.25 lb (95 lb base box)	9.783
Tin Plate, Electrolytic, 0.25 lb (95 lb base box)	8.483
Black Plate, Canmaking Quality (95 lb base box)	7.583
Wire, Drawn, Carbon	9.775
Wire, Drawn, Stainless, 430 (lb)	0.630
Bale Ties (bundle)	7.400
Nails, Wire, 8d Common	9.365
Wire, Barbed (80-rod spool	8.412
Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	May 1 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Index (1935-39 avg=100)	228.59	227.41	227.41	210.45	171.92
Index in cents per lb	6.193	6.161	6.161	5.701	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

Finished Steel, NT	$140.24	$139.71	$139.71	$128.98	$106.32
No. 2 Fdry Pig Iron, GT	64.70	64.70	64.70	60.27	52.54
Basic Pig Iron, GT	64.23	64.23	64.23	59.80	52.16
Malleable Pig Iron, GT	65.77	65.77	65.77	61.27	53.27
Steelmaking Scrap, GT	43.67	42.50	45.00	55.00	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL	May 1 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R.,deld.,Philadelphia	5.365	5.365	5.365	4.93	4.223
Bars, C.F., Pittsburgh	6.85*	6.85*	6.85*	6.25*	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.31	5.31	5.31	5.00	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	5.35	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.49	8.49	8.49	7.60	5.90-6.20
Tin plate (1.50 lb) box, Pitts.	$10.30	$9.95	$9.95	$9.85	$8.70

*Including 0.35c for special quality.

SEMIFINISHED STEEL					
Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{1}{2}$-$\frac{9}{16}$" Pitts.	5.80	5.80	5.80	5.375	4.10-4.30

PIG IRON, Gross Ton	May 1 1957	Week Ago	Month Ago	Year Ago	5 Yr Ago
Bessemer, Pitts.	$65.50	$65.50	$65.50	$61.00	$53.00
Basic, Valley	64.50	64.50	64.50	60.00	52.00
Basic, deld., Phila.	68.38	68.38	68.38	63.76	56.61
No. 2 Fdry, NevilleIsland,Pa.	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, Chicago	65.00	65.00	65.00	60.50	52.50
No. 2 Fdry, deld., Phila.	68.88	68.88	68.88	64.26	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry(Birm.)deld.Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	65.00	65.00	65.00	60.50	52.50
Malleable, Chicago	65.00	65.00	65.00	60.50	52.50
Ferromanganese, Duquesne.	255.00†	255.00†	255.00†	215.00†	188.00*

†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (Including broker's commission)					
No. 1 Heavy Melt, Pittsburgh	$43.50	$41.50	$43.50	$53.50	$44.00
No. 1 Heavy Melt, E. Pa.	48.00	46.00	50.00	57.00	42.50
No. 1 Heavy Melt, Chicago.	39.50	40.00	41.50	54.50	42.50
No. 1 Heavy Melt, Valley	41.50	41.50	39.50	57.50	44.00
No. 1 Heavy Melt, Cleve.	38.50	38.50	37.00	54.50	43.00
No. 1 Heavy Melt, Buffalo.	41.50	41.50	43.50	55.50	43.00
Rails, Rerolling, Chicago	56.50	56.50	55.50	72.50	52.50
No. 1 Cast, Chicago	39.50	39.50	39.50	52.50	49.00

COKE, Net Ton					
Beehive, Furn., Connlsvl.	$15.25	$15.25	$15.25	$14.125	$14.75
Beehive, Fdry, Connlsvl.	18.00	18.00	18.00	16.50	17.50

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Steel Prices

Mill prices as reported to STEEL, May 1, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producting company. Key to producers, page 138; to footnotes, page 140.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 .....$70.50

INGOTS, Alloy (NT)

Detroit R7 .....$74.00
Houston S5 .....74.00
Midland,Pa. C18 .....74.00
Munhall,Pa. U5 .....74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Bessemer,Pa. U5 ....$74.00
Bridgeport,Conn. N19 ..79.00
Buffalo R2 .....74.00
Clairton,Pa. U5 .....74.00
Ensley,Ala. T2 .....74.00
Fairfield,Ala. T2 ....74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 .....74.00
Johnstown,Pa. B2 .....74.00
Lackawanna,N.Y. B2 ..74.00
LoneStar,Tex. L6 ....80.00
Munhall,Pa. U5 .....74.00
S.Chicago,Ill. R2, U5..74.00
S.Duquesne,Pa. U5 ...74.00
Sterling, Ill. N15 .....74.00
Youngstown R2 .....74.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ....$91.50
Bridgeport,Conn. N19 ..96.50
Buffalo R2 .....91.50
Canton,O. R2 .....94.00
Clairton,Pa. U5 .....91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 .....91.50
Fairfield,Ala. T2.....91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 .....91.50
Geneva,Utah C11 .....91.50
Houston S5 .....96.50
Johnstown,Pa. B2 ....91.50
Lackawanna,N.Y. B2..91.50
LosAngeles B3 .....101.00
Midland,Pa. C18 .....91.50
Munhall,Pa. U5 .....91.50
Seattle B3 .....105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ....91.50
S.SanFrancisco B3 ...101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ..$107.00
Bridgeport,Conn. N19.107.00
Buffalo R2 .....107.00
Canton,O. R2 .....107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 .....107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 .....107.00
Houston S5 .....112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 ....107.00
Lackawanna,N.Y. B2.107.00
LosAngeles B3 .....127.00
Massillon,O. R2 .....107.00
Midland,Pa. C18 .....107.00
Munhall,Pa. U5 .....107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa U5 ..107.00
Struthers,O. Y1 .....107.00
Warren,O. C17 .....107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 .....111.50
Canton,O. R2 .....114.00
Cleveland,O. R2 ....111.50
Gary,Ind. U5 .....111.50
S.Chicago,Ill. R2, W14.111.50
S.Duquesne,Pa. U5 ..111.50

SKELP

Aliquippa,Pa. J5 .....4.725
LoneStar,Tex. L6 ....5.025
Munhall,Pa. U5 .....4.625
Warren,O. R2 .....4.625
Youngstown R2, U5 ..4.625

WIRE RODS

AlabamaCity,Ala. R2 ..5.80
Aliquippa,Pa. J5 .....5.80
Alton,Ill. L1 .....6.00
Buffalo W12 .....5.80
Cleveland A7 .....5.80
Donora,Pa. A7 .....5.80
Fairfield,Ala T2 .....5.80
Houston S5 .....6.05
IndianaHarbor,Ind. Y1..5.80
Johnstown,Pa. B2 .....5.80
Joliet,Ill. A7 .....5.80
KansasCity,Mo. S5 ....6.05
Kokomo,Ind. C16 .....5.90
LosAngeles B3 .....6.60
Minnequa,Colo. C10 ....6.05
Monessen,Pa. P17 .....5.80
N.Tonawanda,N.Y. B11 .5.80
Pittsburg,Calif. C11 ....6.60
Portsmouth,O. P12 ....5.80
Roebling,N.J. R5 .....5.90
S.Chicago,Ill. R2 .....5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 ...5.80
Sterling,Ill. N15 .....5.90
Struthers,O. Y1 .....5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 .....5.00
Atlanta A11 .....5.20
Aliquippa,Pa. J5 .....5.00
Bessemer,Ala. T2 .....5.00
Bethlehem,Pa. B2 .....5.05
Birmingham C15 .....5.00
Clairton,Pa. U5 .....5.00
Fairfield,Ala T2 .....5.00
Fontana,Calif. K1 ....5.75
Gary,Ind. U5 .....5.00
Geneva,Utah C11 .....5.00
Houston S5 .....5.10
Ind.Harbor,Ind. I-2 ....5.00
Johnstown,Pa. B2 .....5.05
Joliet,Ill. P22 .....5.00
KansasCity,Mo. S5 ....5.10
Lackawanna,N.Y. B2 ..5.05
LosAngeles B3 .....5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 .....5.00
Niles,Calif. P1 .....5.75
Phoenixville,Pa. P4 ...5.85
Portland,Oreg. O4 ....5.75
Seattle B3 .....5.75
S.Chicago,Ill. U5, W14..5.00
S.SanFrancisco B3 ....5.65
Sterling,Ill. N15 .....5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 ....5.00

Wide Flange

Bethlehem,Pa. B2 ....5.05
Clairton,Pa. U5 .....5.00
Fontana,Calif. K1 .....5.90
IndianaHarbor,Ind. I-2 .5.25
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
Phoenixville,Pa. P4 ...5.85
S.Chicago,Ill. U5 .....5.00

Alloy Std. Shapes

Aliquippa,Pa. J5 .....6.20
Clairton,Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.30
Munhall,Pa. U5 .....6.20
S.Chicago,Ill. U5 .....6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 .....7.35
Bessemer,Ala. T2 .....7.35
Bethlehem,Pa. B2 .....7.40
Clairton,Pa. U5 .....7.35
Fairfield,Ala. T2 .....7.35
Fontana,Calif. K1 ....8.10
Gary,Ind. U5 .....7.35
Geneva,Utah C11 ....7.35
Houston S5 .....7.45
Ind.Harbor,Ind. I-2, Y1.7.35
Johnstown,Pa. B2 .....7.40
KansasCity,Mo. S5 ....7.45
Lackawanna,N.Y. B2 ..7.40
LosAngeles B3 .....8.05
Munhall,Pa. U5 .....7.35
Seattle B3 .....8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 ....8.00
Struthers,O. Y1 .....7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 .....7.40
Lackawanna,N.Y. B2 ..7.40
Munhall,Pa. U5 .....7.35
S.Chicago,Ill. U5 .....7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 .....5.05
Lackawanna,N.Y. B2 ..5.05
Munhall,Pa. U5 .....5.00
S.Chicago,Ill. U5 .....5.00

STEEL SHEET PILING

Lackawanna, N.Y. B2 ..5.90
Munhall,Pa. U5 .....5.90
S.Chicago, Ill. U5 .....5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 .....4.85
Aliquippa,Pa. J5 .....4.85
Ashland,Ky.(15) A10 ..4.85
Bessemer,Ala. T2 .....4.85
Clairton,Pa. U5 .....4.85
Claymont,Del. C22 ....5.70
Cleveland J5, R2 .....4.95
Coatesville,Pa. L7 ....5.25
Conshohocken,Pa. A3 ..4.95
Detroit M1 .....4.95
Ecorse,Mich. G5 .....4.95
Fairfield,Ala. T2 .....4.85
Fontana,Calif.(30) K1 ..5.60
Gary,Ind. U5 .....4.85
Geneva,Utah C11 .....4.85
GraniteCity,Ill. G4 ....5.05
Harrisburg,Pa. P4 .....5.80
Houston S5 .....4.95
Ind.Harbor,Ind. I-2, Y1 4.85
Johnstown,Pa. B2 .....4.85
Lackawanna,N.Y. B2 ..4.85
LoneStar,Tex. L6 .....5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 .....4.85
Newport,Ky. A2 .....4.85
Pittsburgh J5 .....4.85
Riverdale,Ill. A1 .....4.85
Seattle B3 .....5.75
Sharon,Pa. S3 .....4.85
S.Chicago,Ill. U5, W14 4.85
SparrowsPoint,Md. B2..4.85
Sterling,Ill. N19 .....4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 .....4.85
Youngstown R2, U5, Y1.4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 ....6.20
Fontana,Calif. K1 .....7.00
Geneva,Utah C11 .....6.25
Johnstown,Pa. B2 .....5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 ....11.95

PLATES, H.S., L.A.

Aliquippa,Pa. J5 .....7.25
Bessemer,Ala. T2 .....7.25
Clairton,Pa. U5 .....7.25
Claymont,Del. C22 .....7.55
Cleveland J5, R2 .....7.25
Coatesville,Pa. L7 .....7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 .....7.35
Fairfield,Ala. T2 .....7.25
Fontana,Calif.(30) K1..8.00
Gary,Ind. U5 .....7.25
Geneva,Utah C11 .....7.25
Houston S5 .....7.35
Ind.Harbor,Ind. I-2, Y1..7.25
Johnstown,Pa. B2 .....7.25
Munhall,Pa. U5 .....7.25
Pittsburgh J5 .....7.25
Seattle B3 .....8.15
Sharon,Pa. S3 .....7.25
S.Chicago,Ill. U5, W14..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 .....7.25
Youngstown U5, Y1 ....7.25

PLATES, Alloy

Aliquippa,Pa. J5 .....6.85
Claymont,Del. C22 .....6.85
Coatesville,Pa. L7 .....6.85
Fontana,Calif.(30) K1 ..7.60
Gary,Ind. U5 .....6.85
Houston S5 .....6.95
Ind.Harbor,Ind. Y1 .....6.85
Johnstown,Pa. B2 .....6.85
Munhall,Pa. U5 .....6.85
Newport,Ky. A2 .....6.85
Pittsburgh J5 .....6.85
Seattle B3 .....7.75
Sharon,Pa. S3 .....6.85
S.Chicago,Ill. U5, W14..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 .....6.85

FLOOR PLATES

Cleveland J5 .....5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 ....6.275
Ind.Harbor,Ind. I-2 ..5.925
Munhall,Pa. U5 .....5.925
S.Chicago,Ill. U5 ....5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10..5.10
Ashland l.c.l. (15) A10..5.60
Cleveland c.l. R2 .....5.60
Warren.O. c.l. R2 .....5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ..5.075
Aliquippa,Pa.(9) J5 ...5.075
Alton,Ill. L1 .....5.275
Atlanta(9) A11 .....5.275
Bessemer,Ala.(9) T2 ..5.075
Birmingham(9) C15 ..5.075
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 .....5.075
Clairton,Pa.(9) U5 ....5.075
Cleveland(9) R2 .....5.075
Ecorse.Mich.(9) G5 ....5.175
Emeryville,Calif. J7 ..5.825
Fairfield,Ala.(9) T2 ..5.075
Fairless,Pa. (9) U5 ....5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 .....5.075
Houston(9) S5 .....5.325
Ind.Harbor(9) I-2, Y1..5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 ....5.075
LosAngeles(9) B3 ....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.85
N.T'wanda,N.Y.(9)B11 5.425
Pittsburg,Calif.(9) C11..5.775
Pittsburgh(9) J5 .....5.075
Portland,Oreg. O4 ....5.825
Seattle B3, N14 .....5.823
S.Ch'c'go(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5..5.075
S.SanFran.,Calif.(9)B3 5.825
Sterling,Ill.(1) N15 ...5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Tonawanda,N.Y. B12 ..5.45
Torrance,Calif.(9) C11 5.775
Youngstown (9) R2, U5 5.075

BARS, H.R. Leaded Alloy (Including leaded extra)

Warren,O. C17 .....7.125

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.125
Bethlehem,Pa. B2 .....6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 .....6.125
Canton,O. R2 .....6.125
Clairton,Pa. U5 .....6.125
Detroit R7 .....6.125
Ecorse,Mich. G5 .....6.225
Fairless,Pa. U5 .....6.275
Fontana,Calif. K1 ....7.175
Gary,Ind. U5 .....6.125
Houston S5 .....6.375
Ind.Harbor,Ind. I-2, Y1.6.125
Johnstown,Pa. B2 .....6.125
KansasCity,Mo. S5 ....6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 .....7.175
Massillon,O. R2 .....6.125
Midland,Pa. C18 .....6.125
Pittsburgh J5 .....6.125
S.Chicago R2,U5,W14 ..6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 .....6.125
Warren,O. C17 .....6.125
Youngstown U5 .....6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 .....7.425
Bessemer,Ala. T2 .....7.425
Bethlehem,Pa. B2 .....7.425
Bridgeport,Conn. N19 ...7.50
Clairton, Pa. U5 .....7.425
Cleveland R2 .....7.425
Ecorse,Mich. G5 .....7.525
Fairfield,Ala. T2 .....7.425
Fontana,Calif. K1 ....8.125
Gary,Ind. U5 .....7.425
Houston S5 .....7.675
Ind.Harbor,Ind. Y1 .....7.425
Johnstown,Pa. B2 .....7.425
KansasCity,Mo. S5 ....7.675
Lackawanna,N.Y. B2 ..7.425
LosAngeles B3 .....8.125
Pittsburgh J5 .....7.425
Seattle B3 .....8.175
S.Chicago,Ill. U5, W14..7.425
S.Duquesne,Pa. U5 ....7.425
S.SanFrancisco B3 ....8.175
Struthers,O. Y1 .....7.425
Youngstown U5 .....7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem,Pa.(9) B2...5.225
Houston(9) S5 .....5.325
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 ....5.075
Sterling,Ill. N15 .....5.175
Sterling,Ill.(1) N15 ...5.075
Tonawanda,N.Y. B12 ...5.45

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 .....5.075
Atlanta A11 .....5.575
Joliet,Ill. P22 .....5.075
Niles,Calif. P1 .....5.85
Pittsburgh J5 .....5.075
Portland,Oreg. O4 .....5.85
SanFrancisco S7 .....5.95

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 .....6.20
Clairton, Pa. U5 .....6.20
Gary,Ind. U5 .....6.20
Houston S5 .....6.45
KansasCity,Mo. S5 .....6.45
Pittsburgh J5 .....6.20
Youngstown U5 .....6.20

BARS, C.F., Leaded Alloy (Including leaded extra)

Ambridge,Pa. W18 ....9.475
BeaverFalls,Pa. M12 ..9.475
Chicago W18 .....9.475
Cleveland C20 .....9.475
LosAngeles S30 .....11.10
LosAngeles P2 .....11.35
Monaca,Pa. S17 .....9.475
Newark,N.J. W18 .....9.65
Warren,O. C17 .....9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 .....6.85
BeaverFalls,Pa. M12,R2.6.85
Birmingham C15 .....7.45
Bridgeport,Conn. N19 ..7.20
Buffalo B5 .....6.90
Camden,N.J. P13 .....7.30
Carnegie,Pa. C12 .....6.85
Chicago W18 .....6.85
Cleveland A7, C20 .....6.85
Detroit B5, P17 .....7.05
Detroit R7 .....6.85
Donora,Pa. W8 .....6.85
Elyria,O. W8 .....6.85
FranklinPark,Ill. N5 ...6.85
Gary,Ind. U5 .....6.85
GreenBay,Wis. F7 .....6.85
Hammond,Ind. L2, M13.6.85
Hartford,Conn. R2 .....7.35
Harvey,Ill. B5 .....6.85
LosAngeles(49) S30 ....8.30
LosAngeles R2 .....8.75
LosAngeles P2 .....8.30
Mansfield,Mass. B5 ....7.40
Massillon,O. R2, R8 ....6.85
Midland,Pa. C18 .....6.85
Monaca,Pa. S17 .....6.85
Newark,N.J. W18 .....7.30
NewCastle,Pa.(17) B4 ..6.85
Pittsburgh J5 .....6.85
Plymouth,Mich. P5 .....7.10
Putnam,Conn. W18 .....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 .....6.85
SpringCity,Pa. K3 .....7.30
Struthers,O. Y1 .....6.85
Waukegan,Ill. A7 .....6.85
Youngstown F3, Y1 ....6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19.6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ....8.325
BeaverFalls,Pa. M12,R2 8.325
Bethlehem,Pa. B2 .....8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 .....8.325
Camden,N.J. P13 .....8.50
Canton,O. T7 .....8.325
Carnegie,Pa. C12 .....8.325
Chicago W18 .....8.325
Cleveland A7, C20 ....8.325
Detroit B5, P17 .....8.525
Detroit R7 .....8.325
Donora,Pa. A7 .....8.325
Elyria,O. W8 .....8.325
FranklinPark,Ill. N5 ..8.325
Gary,Ind. R2 .....8.325
GreenBay,Wis. F7 .....8.325
Hammond,Ind. L2,M13 8.325
Hartford,Conn. R2 ....8.625
Harvey,Ill. B5 .....8.325
Lackawanna,N.Y. B2 ..8.325
LosAngeles S30 .....10.10
LosAngeles P2 .....10.20
Mansfield,Mass. B5 ...8.625
Massillon,O. R2, R8 ...8.325
Midland,Pa. C18 .....8.325
Monaca,Pa. S17 .....8.325
Newark,N.J. W18 .....8.50
Plymouth,Mich. P5 ....8.525
S.Chicago W14 .....8.325
SpringCity,Pa. K3 .....8.50
Struthers,O. Y1 .....8.325
Warren.O. C17 .....8.325
Waukegan,Ill. A7 .....8.325
Worcester,Mass. A7 ...8.625
Youngstown F3, Y1 ...8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 .....5.075
Atlanta A11 .....5.275
Birmingham C15 .....5.075
Bridgeport,Conn. N9 ...5.30
Buffalo R2 .....5.075
Cleveland R2 .....5.075
Ecorse,Mich. G5 .....5.425
Emeryville,Calif. J7 ..5.825

Fairfield,Ala. T2 ....5.075
Fairless,Pa. U5 .....5.225
Fontana,Calif. K1 ....5.775
Ft.Worth,Tex. (4) T4..5.525
Gary,Ind U5 .....5.075
Houston S5 .....5.325
Ind.Harbor,Ind. I-2 Y1 5.075
Johnstown,Pa. B2 ....5.075
Joliet,Ill. P22 .....5.075
KansasCity,Mo. S5 ....5.325
Lackawanna,N.Y. B2..5.075
LosAngeles B3 .....5.775
Milton,Pa. M18 .....5.225
Minnequa,Colo. C10 ...5.525
Niles,Calif. P1 .....5.85
Pittsburg,Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland,Oreg. O4 ....5.825
SandSprings,Okla. S5 ..5.575
Seattle B3, N14 .....8.825
S.Chicago,Ill. R2 ....5.075
S.Duquesne,Pa. U5 ....5.075
S.SanFrancisco B3 ....5.825
SparrowsPoint,Md. B2 .5.075
Sterling,Ill.(1) N15 ..5.075
Sterling,Ill. N15 .....5.175
Struthers,O. Y1 .....5.075
Tonawanda,N.Y. B12 ..5.65
Torrance,Calif. C11 ..5.775
Youngstown R2, U5 ..5.075

BARS, Reinforcing (Fabricated; to Consumers)

Boston B2 .....7.30
Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown,Pa. ¼-1" B2 6.73
KansasCity,Mo. S5 ....7.00
Lackawanna,N.Y. B2 ..6.50
Marion,O. P11 .....6.70
New York U8 .....7.20
Pittsburgh J5, U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ½-1" B2 ..6.73
Williamsport,Pa. S19 ..6.65

RAIL STEEL BARS

ChicagoHts.(3) C2, I-2 5.075
ChicagoHts.(4)(44) I-2 5.075
ChicagoHts.(4) C2 ....5.075
Ft.Worth,Tex.(26) T4..5.525
Franklin,Pa.(3) F5 ....5.10
Franklin,Pa.(4) F5 ...5.075
JerseyShore,Pa.(4) J8 ..5.10
Marion,O.(3) P11 .....5.10
Moline,Ill.(3) R2 ....5.225
Tonawanda(3) B12 ....5.15
Tonawanda(4) B12 ....5.65
Williamsport,Pa.(3) S19 5.15

BARS, Wrought Iron

Economy,Pa.(S.R.)B14 13.15
Economy,Pa.(D.R.)B14 16.35
Economy(Staybolt)B14. 16.80
McK.Rks(S.R.) L5 ...13.15
McK.Rks(D.R.) L5 ..18.00
McK.Rks.(Staybolt) L5 19.15

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala.City,Ala. R2 ....4.675
Allenport,Pa. P7 ....4.675
Ashland,Ky.(8) A10 ..4.675
Cleveland J5, R2 .....4.675
Conshohocken,Pa. A3..4.725
Detroit(8) M1 .....4.775
Ecorse,Mich. G5 .....4.775
Fairfield,Ala. T2 .....4.675
Fairless,Pa. U5 .....4.725
Fontana,Calif. K1 ....5.525
Gary,Ind. U5 .....4.675
Geneva,Utah C11 ....4.775
GraniteCity,Ill(8) G4..4.875
Ind.Harbor,Ind. I-2, Y1 4.675
Irvin,Pa. U5 .....4.675
Lackawanna,N.Y. B2..4.675
Munhall,Pa. U5 .....4.675
Newport,Ky.(8) A2 ..4.675
Niles,O. M21 .....4.675
Pittsburg,Calif. C11 ..5.375
Pittsburgh J5 .....4.675
Portsmouth,O. P12 ....4.675
Riverdale,Ill. A1 .....4.675
Sharon,Pa. S3 .....4.675
S.Chicago,Ill. W14 ....4.675
SparrowsPoint,Md. B2 .4.675
Steubenville,O. W10 ..4.675
Warren,O. R2 .....4.675
Weirton,W.Va. W6 ...4.675
Youngstown U5, Y1 ...4.675

SHEETS, H.R. (19 Ga. & Lighter)

Niles,O. M21 .....5.75

SHEETS, H.R. Alloy

Gary,Ind. U5 .....7.75
Ind.Harbor,Ind. Y1 ....7.75
Irvin,Pa. U5 .....7.75
Newport,Ky. A2 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength, Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken,Pa. A3 ..6.95
Ecorse,Mich. G5 .....7.00
Fairfield,Ala. T2 .....6.90
Fairless,Pa. U5 .....6 95
Fontana,Calif. K1 ....7.75
Gary,Ind. U5 .....6.90
Ind.Harbor,Ind. I-2, Y1 6.90
Irvin,Pa. U5 .....6.90
Lackawanna(35) B2 ...6.90
Munhall,Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S.Chicago,Ill. U5 .....6.90
SparrowsPoint(36) B2 ..6.90
Warren,O. R2 .....6.90
Weirton,W.Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland,Ky.(8) A10 ..4.925
Cleveland R2 .....5.425
Ind.Harbor,Ind. I-2 ..4.925
Warren,O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport,Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken,Pa. A3 ..5.80
Detroit, M1 .....5.75
Ecorse,Mich. G5 .....5.85
Fairfield,Ala. T2 .....5.75
Fairless,Pa. U5 .....5.80
Follansbee,W.Va. F4 ..5.75
Fontana,Calif. K1 .....7.00
Gary,Ind. U5 .....5.75
GraniteCity,Ill. G4 ....5.95
Ind.Harbor,Ind. I-2, Y1 5.75
Irvin,Pa. U5 .....5.75
Lackawanna,N.Y. B2 ..5.75
Mansfield,O. E6 .....5.75
Middletown,O. A10 ....5.75
Newport,Ky. A2 .....5.75
Pittsburg,Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth,O. P12 ....5.75
SparrowsPoint,Md. B2 ..5.75
Steubenville,O. W10 ....5.75
Warren,O. R2 .....5.75
Weirton,W.Va. W6 ....5.75
Yorkville,O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.525
Ecorse,Mich. G5 .....8.625
Fairless,Pa. U5 .....8.575
Fontana,Calif. K1 ....9.775
Gary,Ind. U5 .....8.525
IndianaHarbor,Ind. Y1 .8.525
Irvin,Pa. U5 .....8.525
Lackawanna(37) B2 ..8.525
Pittsburgh J5 .....8.525
SparrowsPoint(38) B2 .8.525
Warren,O. R2 .....8.525
Weirton,W.Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown,O. A10 ....6.25
Warren,O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland,Ky. A10	6.65	6.90
Canton,O. R2	6.65	7.15
Fairfield T2	6.65	6.90
Gary,Ind. U5	6.65	6.90
GraniteCity,Ill. G4	6.85	...
Ind.Harbor I-2	6.65	6.90
Irvin,Pa. U5	6.65	6.90
Kokomo,Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pittsburgh J5	6.65	...
Pitts.,Calif. C11	7.40	...
SparrowsPt. B2	6.65	...

SHEETS, Culvert—Pure Iron

Ind.Harbor,Ind. I-2 ....6.90
MartinsFry.,O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala.City,Ala. R2 .....6.30‡
Ashland,Ky. A10 ....6.30†
Canton,O. R2 .....6.30‡
Dover,O. R1 .....6.30†
Fairfield,Ala. T2 .....6.30†
Gary,Ind. U5 .....6.30†
GraniteCity,Ill. G4 ....6.50*
Ind.Harbor,Ind. I-2 ...6.30†
Irvin,Pa. U5 .....6.30†
Kokomo,Ind. C16 ....6.40†
MartinsFerry,O. W10 ..6.30*
Middletown,O. A10 ....6.30†
Pittsburg,Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt.,Md. B2 ..6.30†
Warren,O. R2 .....6.30†
Weirton,W.Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana,Calif. K1 ....7.025

SHEETS, Galvanized High-Strength, Low-Alloy

Irvin,Pa. U5 .....9.275
SparrowsPoint(39) B2..9.275

SHEETS, Galvannealed Steel

Canton,O. R2 .....6.70
Irvin,Pa. U5 .....6.70

SHEETS, Galvanized Ingot Iron (Hot-Dipped Continuous)

Ashland,Ky. A10 .....6.55
Middletown,O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland (28) R2 ....7.125
Niles,O.(28) R2 .....7.125
Weirton,W.Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler,Pa. A10 (type 1) 8.95
Butler,Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland,Ky. A10 ....6.325
Cleveland R2 .....6.325
Gary,Ind. U5 .....6.325
GraniteCity,Ill. G4 ....6.525
Ind.Harbor,Ind. I-2, Y1 6.325
Irvin,Pa. U5 .....6.325
Middletown,O. A10 ....6.325
Niles,O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee,W.Va. F4 ..8.35
Ind.Harbor,Ind. I-2 ...8.175
Yorkville,O. W10 ....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom,W.Va. W10 6.70
Gary,Ind. U5 .....6.70
Mansfield,O. E6 .....6.70
Middletown,O. A10 ....6.70
Niles,O. M21 .....6.70
Weirton,W.Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown,O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div., Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div., Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div., H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division, Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div., Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman&Scott
M21 Mallory-Sharon Titanium Corp.
M22 Mill Strip Products Co.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest.SteelRoll.Mill
N15 Northwestern S.&W.Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co., Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Pollak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div.,EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn.Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala. City, Ala. (27) R2	4.675
Allenport, Pa. P7	4.675
Alton, Ill. L1	4.875
Ashland, Ky. (8) A10	4.675
Atlanta A11	4.875
Bessemer, Ala. T2	4.675
Birmingham C15	4.675
Buffalo (27) R2	4.675
Conshohocken, Pa. A3	4.725
Detroit M1	4.775
Ecorse, Mich. G5	4.775
Fairfield, Ala. T2	4.675
Fontana, Calif. K1	5.525
Gary, Ind. U5	4.675
Houston S5	4.925
Ind. Harbor, Ind. I-2, Y1	4.675
Johnstown, Pa. (25) B2	4.675
Kansas City, Mo. S5	4.925
Lackaw'na, N.Y. (25) B2	4.675
Los Angeles (25) B3	5.425
Minnequa, Colo. C10	5.775
Pittsburg, Calif. C11	5.425
Riverdale, Ill. A1	4.675
San Francisco S7	5.95
Seattle (25) B3	5.675
Seattle N14	5.675
Sharon, Pa. S3	4.675
S. Chicago, Ill. W14	4.675
S. San Francisco (25) B3	5.425
Sparrows Point, Md. B2	4.675
Sterling, Ill. (1) N15	4.675
Sterling, Ill. N15	4.775
Torrance, Calif. C11	5.425
Warren, O. R2	4.675
Weirton, W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Carnegie, Pa. S18	7.75
Gary, Ind. U5	7.75
Ind. Harbor, Ind. Y1	7.75
Los Angeles B3	8.95
Newport, Ky. A2	7.75
Sharon, Pa. S3	7.75
S. Chicago, Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer, Ala. T2	6.95
Conshohocken, Pa. A3	6.95
Ecorse, Mich. G5	7.05
Fairfield, Ala. T2	6.95
Gary, Ind. U5	6.95
Houston S5	7.20
Ind. Harbor, Ind. I-2, Y1	6.95
Kansas City, Mo. S5	7.20
Lackawanna, N.Y. B2	6.95
Los Angeles (25) B3	7.70
Seattle (25) B3	7.95
Sharon, Pa. S3	6.95
S. San Francisco (25) B3	7.70
Sparrows Point, Md. B2	6.95
Warren, O. R2	6.95
Weirton, W.Va. W6	6.95
Youngstown U5, Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland, Ky. (8) A10	4.925
Warren, O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson, Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken, Pa. A3	6.90
Dearborn, Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover, O. G6	6.85
Ecorse, Mich. G5	6.95
Evanston, Ill. M22	6.95
Follansbee, W.Va. F4	6.85
Fontana, Calif. K1	8.70
Franklin Park, Ill. T6	6.95
Ind. Harbor, Ind. Y1	6.85
Indianapolis C8	7.00
Los Angeles C1	8.90
New Bedford, Mass. R10	7.30
New Britain (10) S15	6.85
New Castle, Pa. B4, E5	6.85
New Haven, Conn. D2	7.30
Now Kensington, Pa. A6	6.85
Pawtucket, R.I. R3	7.50
Pawtucket, R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale, Ill. A1	6.95
Rome, N.Y. (32) R6	6.85
Sharon, Pa. S3	6.85
Trenton, N.J. (31) R5	8.30
Wallingford, Conn. W2	7.30
Warren, O. R2, T5	6.85
Weirton, W.Va. W6	6.85
Worcester, Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie, Pa. S18	14.55
Cleveland A7	14.55
Dover, O. G6	14.55
Franklin Park, Ill. T6	14.55
Harrison, N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket, R.I. N8	14.90
Sharon, Pa. S3	14.55
Worcester, Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn, Mich. D3	10.10
Dover, O. G6	10.10
Ecorse, Mich. G5	10.10
Ind. Harbor, Ind. Y1	10.20
Sharon, Pa. S3	10.00
Warren, O. R2	10.00
Weirton, W.Va. W6	10.00
Youngstown Y1	10.20

STRIP, Cold-Rolled Ingot Iron

Warren, O. R2	7.60

STRIP, C.R. Electrogalvanized

Cleveland A7	6.85*
Dover, O. G6	6.85*
Evanston, Ill. M22	6.95
Riverdale, Ill. A1	6.95*
Warren, O. B9, T5	6.85*
Worcester, Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon, Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale, Ill. A1	5.25
Sharon, Pa. S3	5.10
Youngstown U5	5.10

STRIP, Cold-Finished Spring Steel (Annealed)	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	9.20	10.40	12.60	15.60	18.55
Boston T6	9.20	10.40	12.60	15.60	18.55
Bristol, Conn. W1	....	10.40	12.60	15.60	18.55
Carnegie, Pa. S18	8.65	10.10	12.30	15.30	....
Cleveland A7	8.65	10.10	12.30	15.30	18.25
Cleveland C7	....	10.10	12.30	15.30	18.25
Dearborn, Mich. D3	8.75	10.20	12.40	....	....
Detroit D2	8.75	10.20	12.40	15.40	....
Dover, O. G6	8.65	10.10	12.30	15.30	18.25
Evanston, Ill. M22	8.65	10.10	12.30	....	....
Franklin Park, Ill. T6	8.75	10.10	12.30	15.30	18.25
Harrison, N.J. C18	....	....	12.60	15.60	18.55
Indianapolis C8	8.80	10.25	12.30	15.30	18.25
Los Angeles C1	10.85	12.30	14.50	....	....
New Britain, Conn. (10) S15	8.65	10.10	12.30	15.30	18.25
New Castle, Pa. B4, E5	8.65	10.10	12.30	15.30	....
New Haven, Conn. D2	9.10	10.40	12.60	15.60	....
New Kensington, Pa. A6	8.65	10.10	12.30	15.30	....
New York W3	....	10.40	12.60	15.60	18.55
Pawtucket, R.I. N8	9.20	10.40	12.60	15.60	18.55
Riverdale, Ill. A1	8.75	10.10	12.30	15.30	18.25
Rome, N.Y. (32) R6	8.65	10.10	12.30	15.30	18.25
Sharon, Pa. S3	8.65	10.10	12.30	15.30	18.25
Trenton, N.J. R5	....	10.40	12.60	15.60	18.55
Wallingford, Conn. W2	9.10	10.40	12.60	15.60	18.45
Warren, O. T5	8.65	10.10	12.30	15.30	18.25
Worcester, Mass. A7, T6	9.20	10.40	12.60	15.60	18.55
Youngstown C8	8.65	10.10	12.30	15.30	18.25

Spring Steel (Tempered)			Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol, Conn. W1	....	....	17.10	20.95	25.30
Buffalo W12	....	....	17.10	....	....
Franklin Park, Ill. T6	....	....	17.45	21.30	25.65
Harrison, N.J. C18	....	....	17.10	20.95	25.30
New York W3	....	....	17.10	20.95	25.30
Palmer, Mass. W12	....	....	17.10	....	....
Trenton, N.J. R5	....	....	17.10	20.95	25.30
Worcester, Mass. A7, T6	....	....	17.10	20.95	25.30
Youngstown C8	....	....	17.45	21.30	25.65

SILICON STEEL

H.R. SHEETS (22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
Beech Bottom, W.Va. W10	....	....	11.00	12.05	13.05
Brackenridge, Pa. A4	....	....	11.00	12.05	13.05
Mansfield, O. E6	9.20	10.35	11.00	12.05	13.05
Newport, Ky. A2	9.20	10.35	11.00	12.05	13.05
Niles, O. M21	9.20	10.35	11.00	12.05	....
Vandergrift, Pa. U5	....	10.35	11.00	12.05	13.05
Warren, O. R2	9.20	10.35	11.00	12.05	....
Zanesville, O. A10	....	10.35	11.00	12.05	13.05
Zanesville, O. A10 (FP coils)	....	10.85	11.525	12.575	13.55
Zanesville, O. A10 (SPcoils)	....	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge, Pa. A4	....	....	11.525	12.575	13.55
Granite City, Ill. G4	9.40*	10.55*	11.225*†	12.275*	....
Indiana Harbor, Ind. I-2	9.20†	10.35*	11.025*†	12.075*	....
Mansfield, O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift, Pa. U5	9.20*	10.35*	11.025*†	12.075*	13.05*†
Vandergrift, Pa. U5	....	10.85†	11.525††	12.575†	13.55†
Warren, O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
Beech Bottom, W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge, Pa. A4	14.05	....	....	....
Vandergrift, Pa. U5	14.05	14.60	15.10	16.15
Zanesville, O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge, Pa. A4	....	16.90	18.50	19.00	19.50	....
Butler, Pa. A10	....	....	18.50	19.00	19.50	....
Vandergrift, Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren, O. R2	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$8.75	$9.00	$9.40
Fairfield, Ala. T2	8.85	9.10	9.50
Fairless, Pa. U5	8.85	9.10	9.50
Fontana, Calif. K1	9.50	9.75	10.15
Gary, Ind. U5	8.75	9.00	9.40
Granite City, Ill. G4	8.85	9.10	9.50
Indiana Harbor, Ind. I-2, Y1	8.75	9.00	9.40
Irvin, Pa. U5	8.75	9.00	9.40
Niles, O. R2	8.75	9.00	9.40
Pittsburg, Calif. C11	9.50	9.75	10.15
Sparrows Point, Md. B2	8.85	9.10	9.50
Weirton, W.Va. W6	8.75	9.00	9.40
Yorkville, O. W10	8.75	9.00	9.40

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa, Pa. J5	7.425	7.625	....
Niles, O. R2	7.425	7.625	7.925

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa, Pa. J5	$10.05	$10.30
Fairfield, Ala. T2	10.15	10.40
Fairless, Pa. U5	10.15	10.40
Fontana, Calif. K1	10.80	11.05
Gary, Ind. U5	10.05	10.30
Irvin, Pa. U5	10.05	10.30
Pitts., Calif. C11	10.80	11.05
Sp. Pt., Md. B2	10.15	10.40
Weirton, W.Va. W6	10.05	10.30
Yorkville, O. W10	10.05	10.30

BLACK PLATE (Base Box)

Aliquippa, Pa. J5	$7.85
Fairfield, Ala. T2	7.95
Fairless, Pa. U5	7.95
Fontana, Calif. K1	8.60
Gary, Ind. U5	7.85
Granite City, Ill. G4	7.95
Ind. Harbor, Ind. I-2, Y1	7.85
Irvin, Pa. U5	7.85
Niles, O. R2	7.85
Pittsburg, Calif. C11	8.60
Sparrows Point, Md. B2	7.95
Weirton, W.Va. W6	7.85
Ind. Harbor, Ind. Y1	7.50
Irvin, Pa. U5	7.50
Yorkville, O. W10	7.50

MANUFACTURING TERNES (Special Coated; Base Box)

Gary, Ind. U5	$9.70
Irvin, Pa. U5	9.70

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary, Ind. U5	$11.25

WIRE

WIRE, Manufacturers Bright, Low Carbon

Alabama City, Ala. R2	7.20
Aliquippa, Pa. J5	7.20
Alton, Ill. L1	7.40
Atlanta A11	7.40
Bartonville, Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville, Ind. M8	7.30
Donora, Pa. A7	7.20
Duluth A7	7.20
Fairfield, Ala. T2	7.20
Fostoria, O. (24) S1	7.30
Houston S5	7.45
Jacksonville, Fla. M8	7.55
Johnstown, Pa. B2	7.20
Joliet, Ill. A7	7.20
Kansas City, Mo. S5	7.45
Kokomo, Ind. C16	7.30
Los Angeles B3	8.15
Minnequa, Colo. C10	7.45
Monessen, Pa. P7, P16	7.20
N. Tonawanda, N.Y. B11	7.20
Palmer, Mass. W12	7.50
Pittsburg, Calif. C11	8.15
Portsmouth, O. P12	7.20
Rankin, Pa. A7	7.20
S. Chicago, Ill. R2	7.20
S. San Francisco C10	8.15
Sparrows Point, Md. B2	7.30
Sterling, Ill. (1) N15	7.20
Sterling, Ill. N15	7.30
Struthers, O. Y1	7.20
Waukegan, Ill. A7	7.20
Worcester, Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville, Ill. K4	11.90
Buffalo W12	11.90
Cleveland A7	11.90
Donora, Pa. A7	11.90
Duluth A7	11.90
Johnstown, Pa. B2	11.90
Minnequa, Colo. C10	12.025
Monessen, Pa. P16	11.90
Muncie, Ind. I-7	12.10
New Haven, Conn. A7	12.20
Palmer, Mass. W12	12.20
Pittsburg, Calif. C11	12.70
Portsmouth, O. P12	11.90
Roebling, N.J. R5	12.20
Sparrows Pt., Md. B2	12.00
Struthers, O. Y1	11.90
Trenton, N.J. A7	12.20
Waukegan, Ill. A7	11.90
Worcester, Mass. A7	12.20

WIRE, Upholstery Spring

Aliquippa, Pa. J5	8.70
Alton, Ill. L1	8.90
Buffalo W12	8.70
Cleveland A7	8.70
Donora, Pa. A7	8.70
Duluth A7	8.70
Johnstown, Pa. B2	8.70
Kansas City, Mo. S5	8.95
Minnequa, Colo. C10	8.90
Los Angeles B3	9.65
Monessen, Pa. P7, P16	8.70
New Haven, Conn. A7	9.00
Palmer, Mass. W12	9.00
Pittsburg, Calif. C11	9.65
Portsmouth, O. P12	8.70
Roebling, N.J. R5	8.70
S. Chicago, Ill. R2	8.70
S. San Francisco C10	9.65
Sparrows Pt., Md. B2	8.80
Struthers, O. Y1	8.70
Trenton, N.J. A7	9.00
Waukegan, Ill. A7	8.70
Worcester, Mass. A7	9.00

WIRE, MB Spring, High Carbon

Aliquippa, Pa. J5	9.025
Alton, Ill. L1	9.225
Bartonville, Ill. K4	9.125
Buffalo W12	9.025
Cleveland A7	9.025
Donora, Pa. A7	9.025
Duluth A7	9.025
Fostoria, O. S1	9.075
Johnstown, Pa. B2	9.025
Los Angeles B3	9.975
Milbury, Mass. (12) W6	9.325
Minnequa, Colo. C10	9.275
Monessen, Pa. P7, P16	9.025
Muncie, Ind. I-7	9.225
Palmer, Mass. W12	9.325
Pittsburg, Calif. C11	9.975
Portsmouth, O. P12	9.025
Roebling, N.J. R5	9.025
S. Chicago, Ill. R2	9.025
S. San Francisco C10	9.975
Sparrows Pt., Md. B2	9.125
Struthers, O. Y1	9.025
Trenton, N.J. A7	9.325
Waukegan, Ill. A7	9.025
Worcester J4, T6, W12	9.325
Worcester, Mass. A7	9.325

WIRE, Fine & Weaving (8" Coils)

Alton, Ill. L1	14.65
Bartonville, Ill. K4	14.25
Buffalo W12	14.45
Chicago W13	14.45
Cleveland A7	14.45
Crawfordsville, Ind. M8	14.25
Fostoria, O. S1	14.45
Jacksonville, Fla. M8	14.50
Johnstown, Pa. B2	14.45
Kokomo, Ind. C16	14.45
Monessen, Pa. P6	14.20
Muncie, Ind. I-7	14.65
Palmer, Mass. W12	14.75
Roebling, N.J. C10	14.45
S. San Francisco C10	14.80
Waukegan, Ill. A7	14.45
Worcester, Mass. A7, T6	14.75

ROPE WIRE

Bartonville, Ill. K4	12.00
Buffalo W12	12.00
Fostoria, O. S1	12.00
Johnstown, Pa. B2	12.00
Monessen, Pa. P7	11.55
Muncie, Ind. I-7	12.20
Palmer, Mass. W12	12.30
Portsmouth, O. P12	12.00
Roebling, N.J. R5	12.30
Sparrows Pt., Md. B2	12.10
Struthers, O. Y1	12.00
Worcester, Mass. J4	12.30

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	15.75
Monessen,Pa. P16	15.45
Roebling,N.J. R5	16.10

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	10.75
Baltimore T6	11.05
Boston T6	11.05
Buffalo W12	10.75
Chicago W13	10.85
Cleveland A7	10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	10.75
Fostoria,O. S1	11.05
FranklinPark,Ill. T6	10.85
Kokomo,Ind. C16	10.75
Massillon,O. R8	10.75
Milwaukee C23	10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	11.05
Pawtucket,R.I. N8	11.05
Riverdale,Ill. A1	10.85
Rome,N.Y. R6	10.75
Trenton,N.J. R5	11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES,

Stock	Col.
AlabamaCity,Ala. R2	164
Aliquippa,Pa. J5	164
Atlanta A11	166
Bartonville,Ill. K4	166
Crawfordsville,Ind. M8	166
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex. S5	169
Jacksonville,Fla.(20) M8	175
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
KansasCity,Mo. S5	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	169
Monessen,Pa. P7	164
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	166
Sterling,Ill. (7) N15	166
Worcester,Mass. A7	170

NAILS, Stock

Chicago W13	164
Cleveland A9	170

(To Wholesalers; per cwt)

Galveston,Tex. D7	$8.75

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	$9.80
Wheeling,W.Va. W10	9.80

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)
Coil No. 3150

AlabamaCity,Ala. R2	$9.53
Atlanta A11	9.63
Bartonville Ill. K4	9.63
Buffalo W12	9.82
Chicago W13	9.82
Crawfordsville,Ind. M8	9.63
Donora,Pa. A7	9.82
Duluth A7	9.82
Fairfield,Ala. T2	9.82
Houston S5	10.07
Jacksonville,Fla. M8	10.09
Johnstown,Pa. B2	9.82
Joliet,Ill. A7	9.82
KansasCity,Mo. S5	10.07
Kokomo,Ind. C16	9.92
LosAngeles B3	10.61
Minnequa,Colo. C10	10.07
Pittsburg,Calif. C11	10.60
S.Chicago,Ill. R2	9.53
S.SanFrancisco C10	10.60
SparrowsPt.,Md. B2	9.92
Sterling,Ill.(37) N15	9.82

Coil No. 6500 Stand.

AlabamaCity,Ala. R2	$9.85
Atlanta A11	9.95
Bartonville,Ill. K4	9.95
Buffalo W12	10.15
Chicago W13	10.15
Crawfordsville,Ind. M8	9.95
Donora,Pa. A7	10.15
Duluth A7	10.15
Fairfield,Ala. T2	10.15
Houston S5	10.40
Jacksonville,Fla. M8	10.41
Johnstown,Pa. B2	10.15
Joliet,Ill. A7	10.15
KansasCity,Mo. S5	10.40
Kokomo,Ind. C16	10.25
LosAngeles B3	10.95
Minnequa,Colo. C10	10.40
Pittsburg,Calif. C11	10.95
S.Chicago,Ill. R2	9.85
S.SanFrancisco C10	10.95
SparrowsPt.,Md. B2	10.25
Sterling,Ill.(37) N15	10.15

Coil Interim

AlabamaCity,Ala. R2	$9.90
Atlanta A11	10.00
Bartonville,Ill. K4	10.00
Buffalo W12	10.20
Chicago W13	10.20
Crawfordsville,Ind. M8	10.00
Donora,Pa. A7	10.20
Duluth A7	10.20
Fairfield,Ala. T2	10.20
Houston S5	10.45
Jacksonville,Fla. M8	10.46
Johnstown,Pa. B2	10.20
Joliet,Ill. A7	10.20
KansasCity,Mo. S5	10.45
Kokomo,Ind. C16	10.30
LosAngeles B3	11.00
Minnequa,Colo. C10	10.45
Pittsburg,Calif. C11	11.00
S.Chicago,Ill. R2	9.90
S.SanFrancisco C10	11.00
SparrowsPt.,Md. B2	10.30
Sterling,Ill. (37) N15	10.20

BALE TIES, Single Loop

	Col.
AlabamaCity,Ala. R2	190
Atlanta A11	192
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	192
Donora,Pa. A7	196
Duluth A7	196
Fairfield,Ala. T2	196
Houston S5	*201*
Jacksonville,Fla. M8	197
Joliet,Ill. A7	190
KansasCity,Mo. S5	*201*
Kokomo,Ind. C16	198
Minnequa,Colo. C10	195
Pittsburg,Calif. C11	220
S.Chicago,Ill. R2	190
S.SanFrancisco C10	214
Sterling,Ill. (7) N15	196
SparrowsPt.,Md. B2	198
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	167
Duluth A7	167
Franklin,Pa. F5	167
Huntington,W.Va. W7	169
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
Sterling,Ill.(1) N15	167
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

WIRE, Barbed

	Col.
AlabamaCity,Ala. R2	184**
Aliquippa,Pa. J5	181§
Atlanta A11	190*
Bartonville,Ill. K4	190
Crawfordsville,Ind. M8	190
Donora,Pa. A7	184†
Duluth A7	184†
Fairfield,Ala. T2	184†
Houston,Tex. S5	189**
Jacksonville,Fla. M8	195
Johnstown,Pa. B2	188*
Joliet,Ill. A7	184†
KansasCity,Mo. S5	189**
Kokomo,Ind. C16	186†
Minnequa,Colo. C10	189**
Monessen,Pa. P7	188*
Pittsburg,Calif. C11	204†
Rankin,Pa. A7	184†
S.Chicago,Ill. R2	184**
S.SanFrancisco C10	204**
SparrowsPoint,Md. B2	190*
Sterling,Ill.(7) N15	190*

WOVEN FENCE, 9-15 Ga.

	Col.
Ala.City,Ala. R2	176**
Aliq'ppa,Pa. 9-14½ga.J5	179§
Atlanta A11	182*
Bartonville,Ill. K4	182
Crawfordsville,Ind. M8	182
Donora,Pa. A7	176†
Duluth A7	176†
Fairfield,Ala. T2	176†
Houston,Tex. S5	181**
Jacksonville,Fla. M8	187
Johnstown,Pa.(43) B2	180*
Joliet,Ill. A7	176†
KansasCity,Mo. S5	181**
Kokomo,Ind. C16	178†
Minnequa,Colo. C10	181**
Monessen,Pa. 9 ga. P7	180*
Pittsburg,Calif C11	199†
Rankin,Pa. A7	176†
S.Chicago,Ill. R2	176**
Sterling,Ill.(7) N15	182*

WIRE (16 gage) Stone Stone

	An'ld	Galv.
Ala.City,Ala.R2	15.70	17.25**
Aliq'ppa,Pa. J5	15.70	17.50
Bartonville K4	15.80	17.75
Buffalo W12	16.10	
Cleveland A7	16.00	
Crawf'dsville M8	15.80	17.75
Fostoria,O. S1	16.50	18.05†
Houston S5	*16.25*	*17.80***
Jacksonville M8	16.05	18.00
Johnstown B2	16.00	17.95*
Kan.City,Mo. S5	*16.25*	
Kokomo C16	16.10	17.65†
Minnequa C10	16.25	17.80*
P'lm'r,Mass. W12	16.30	17.85†
Pitts.,Calif. C11	16.35	17.90†
SparrowsPt. B2	16.10	18.05*
Sterling(37) N15	16.00	17.95*
Waukegan A7	16.00	17.55†
Worcester A7	16.30	

WIRE, Merchant Quality

(6 to 8 gage)	An'ld	Galv.
Ala.City,Ala. R2	7.95	8.35**
Aliquippa J5	7.95	8.475§
Atlanta (48) A11	8.05	8.65*
Bartonville(48)	K4.	8.05 8.65
Buffalo W12	8.20	8.75†
Cleveland A7	8.20	
Crawfordsville M8	8.05	8.65
Donora,Pa. A7	8.20	8.75†
Duluth A7	8.20	8.75†
Fairfield T2	8.20	8.75†
Houston(48) S5	8.45	9.00**
Jacks'ville,Fla. M8	8.30	8.90
Johnstown B2(48)	8.20	8.95*
Joliet,Ill. A7	8.20	8.75†
Kans.City(48) S5	8.45	9.00**
Kokomo C16	8.30	8.85†
LosAngeles B3	9.15	9.90*
Minnequa C10	8.45	9.00‡
Monessen P7(48)	7.95	8.55*
Palmer,Mass. W12	8.50	9.05†
Pitts.,Calif. C11	9.15	9.70†
Rankin,Pa. A7	8.20	8.75†
S.Chicago R2	7.95	8.35**
S.SanFran. C10	9.15	9.70*
Spar'wsPt. B2(48)	8.30	9.05*
Sterling(37)(48)N15	8.35	9.10
Struth'rs,O.(48)Y1	8.20	8.85‡
Worcester,Mass.A7	8.50	9.05†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10c. ††13c. **Subject to zinc equalization extras.

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts
Full Size Body (cut thread)

½ in. and smaller:	
6 in. and shorter	52.5
Lower than 6 in.	43.5
⅝ in. thru 1 in:	
6 in. and shorter	43.5
Longer than 6 in.	41.5
1¼ in. and larger:	
All lengths	41.5
Undersized Body (rolled thread)	
½ in. and smaller:	
6 in. and shorter	52.5

Carriage, Machine,Lag Bolts
Hot Galvanized:

½ in. and smaller:	
6 in. and shorter	32.0
Longer than 6 in.	19.0
⅝ in. thru 1 in.:	
6 in. and shorter	16.0
Longer than 6 in.	16.0
1¼ in. and larger:	
All lengths	16.0

Lag Bolts
All diameters:

6 in. and shorter	52.5
Longer than 6 in.	44.5

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter	52.0
Larger than ½ in. or longer than 6 in.	44.5
Blank Bolts	44.5
Step, Elevator, Tire Bolts	52.0
Stove Bolts, Slotted	
⅛ to ¼-in. incl., 3 in. and shorter	54.00
5/16 to ⅜-in., inclusive	54.00

NUTS

Reg. & Heavy Square Nuts:	
All sizes	58.0
Square Nuts, Reg. & Heavy, Hot Galvanized:	
All sizes	44.0
Hex Nuts, Reg. & Heavy, Hot Pressed:	
¾ in. and smaller	61.5
⅞ in. to 1 in., incl.	57.5
1⅛ in. to 1½ in., incl.	62.5
1⅝ in. and larger	56.0
Hex Nuts, Reg. & Heavy, Cold Punched:	
¾ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0
Hex Nuts, All Types, Hot Galvanized:	
¾ in. and smaller	48.0
⅞ in. to 1 in., incl.	44.0
1⅛ in. to 1½ in., incl.	49.0
Hex Nuts, Semifinished, Heavy (Incl. Slotted):	
¾ in. and smaller	61.5
⅞ in. to 1½ in., incl.	57.5
1⅝ in. and larger	56.0
Hex Nuts, Finished (Incl. Slotted and Castellated):	
1 in. and smaller	64.00
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

Semifinished Hex Nuts, Reg. (Including Slotted):

⅝ in. and smaller	61.5
¾ in. to 1-in., incl.	64.0
1⅛ in. to 1½ in., incl.	60.5
1⅝ in. and larger	56.0

CAP AND SET SCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)
Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:	
⅝ in. and smaller	44.0
¾, ⅞ and 1 in. diam.	27.0
Longer than 6 in.:	
⅝ in. and smaller	14.0
¾, ⅞ and 1 in. diam.	0.5

High Carbon, Heat Treated:

6 in. and shorter:	
⅝ in. and smaller	31.0
¾, ⅞ and 1 in. diam.	9.0
Longer than 6 in.:	
⅝ in. and smaller	+6
¾, ⅞ and 1 in. diam.	+24
Flat Head Cap Screws:	
¾ in. and smaller.	+65.0
Set Screws, Square Head, Cup Point, Coarse Thread	
Through 1 in. diam.:	
6 in. and shorter	11
Longer than 6 in.	+10

RIVETS

F.o.b Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.
Structural ½-in., larger 11.50
7/16-in. under List less 23%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft. inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	24.55	23.54
1¼	13	....	29.07	23.36
1½	13	27.45	32.14	25.83
1¾	13	32.43	37.97	30.51
2	13	36.34	42.56	34.20
2¼	13	40.93	47.94	38.52
2¼	12	44.42	52.03	41.81
2½	12	48.94	57.31	46.05
2¾	12	52.99	62.05	49.88
3	12	56.51	66.18	53.19

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.275	5.175	5.225	6.25
Ensley,Ala. T2	5.275	5.175	....	6.25
Fairfield,Ala. T2	....	....	....	6.25
Huntington,W.Va. C15	....	....	....	6.25
Gary,Ind. U5	5.275	5.175	5.225	...
IndianaHarbor,Ind. I-2	5.275	5.175	5.225	...
Johnstown,Pa. B2	....	....	...(16)	6.25
Lackawanna,N.Y. B2	5.275	5.175	....	6.25
Minnequa,Colo. C10	5.275	5.175	....	6.75
Steelton,Pa. B2	5.275	5.175	....	...
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	6.275
Gary,Ind. U5	6.275
Ind.Harbor,Ind. I-2	6.275
Lackawanna,N.Y. B2	6.275
Minnequa,Colo. C10	6.275
Seattle B3	6.425
Steelton,Pa. B2	6.275
Torrance,Calif. C11	6.425

JOINT BARS

Bessemer,Pa. U5	6.60
Fairfield,Ala. T2	6.60
Ind.Harbor,Ind. I-2	6.60
Joliet,Ill. U5	6.60
Lackawanna,N.Y. B2	6.60
Minnequa,Colo. C10	6.60
Steelton,Pa. B2	6.60

AXLES

Ind.Harbor,Ind. S13	8.35
Johnstown,Pa. B2	8.35

TRACK BOLTS, Untreated

Cleveland R2	13.85
KansasCity,Mo. S5	13.85
Lebanon,Pa. B2	13.85
Minnequa,Colo. C10	13.85
Pittsburgh P14	13.10
Seattle B3	14.35

SCREW SPIKES

Lebanon,Pa. B2	13.60
Pittsburgh P14	12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	9.225
Ind.Harbor,Ind. I-2, Y1	9.225
KansasCity,Mo. S5	9.225
Lebanon,Pa. B2	9.225
Minnequa,Colo. C10	9.225
Pittsburgh J5	9.225
Seattle B3	9.725
S.Chicago,Ill. R2	9.225
Struthers,O. Y1	9.225
Youngstown R2	9.225

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 5/16 in.; 6.23c; 1 15/16 to 8 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) Chicago base 2 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.25c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn. base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.685c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in. and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(37) Chicago base, 10 points lower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.25c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(44) To fabricators.
(48) 6-7 Ga.
(49) 3½-in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Ambridge, Pa. N2	+5.25	....	1.25	....	3.75	....	5.25	....	5.25	....	5	....	7.5	....
Lorain, O. N3	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25
Youngstown Y1	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+5.25	+23.25	1.25	+17.5	3.75	+15	5.25	+13.5	5.25	+13.5	5	+13.75	7.5	+11.25

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		8c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Alton, Ill. L1	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Benwood, W. Va. W10	6.5	+24	+4.75	+32.25	+14.75	+42.25	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Butler, Pa. F6	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Fairless, Pa. N3	....	....	....	....	....	....	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Fontana, Calif. K1	....	....	....	....	....	....	+3.75	+23	+0.75	+19	2.75	+14.5	5.25	+12.75
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	8.25	+11	11.25	+7	14.75	+2.5	17.25	+0.75
Lorain, O. N3	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sharon, Pa. S4	7.5	+23	+3	+30.5	+12.5	+40	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Sparrows Pt., Md. B2	5.5	+25	+0.5	+32.5	+14.5	+42	7.25	+12	10.25	+8	13.75	+3.5	16.25	+1.75
Wheatland, Pa. W9	7.5	+23	+3	+30.5	+12.5	+40	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25
Youngstown R2, Y1	....	....	....	....	....	....	9.25	+10	12.25	+6	15.75	+1.5	18.25	0.25

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.68		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Alton, Ill. L1	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	....	....	....	....
Benwood, W. Va. W10	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Etna, Pa. N2	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Fairless, Pa. N3	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Fontana, Calif. K1	5.75	+11.75	6.25	+11.25	7.75	+10.5	7.75	+10.5	+2.75	+21.5	+2.75	+21.5
Indiana Harbor, Ind. Y1	17.75	0.25	18.25	0.75	19.75	1.5	19.25	1.5	9.25	+9.5	9.25	+9.5
Lorain, O. N3	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sharon, Pa. M6	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	....	....	....	....
Sparrows Pt., Md. B2	16.75	+0.75	17.25	+0.25	18.75	0.5	18.75	0.5	8.25	+10.5	8.25	+10.5
Wheatland, Pa. W9	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5
Youngstown R2, Y1	18.75	1.25	19.25	1.75	20.75	2.5	20.75	2.5	10.25	+8.5	10.25	+8.5

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	21.25	26.00	....	34.50	....	40.50	42.50	46.75	43.25
202	22.75	29.00	35.00	37.50	39.25	41.25	43.25	47.25	47.25
301	22.25	27.00	35.75	35.75	40.25	42.50	44.50	49.25	45.75
302	24.25	30.25	36.50	39.00	41.00	43.25	45.50	50.00	50.00
302B	24.50	31.50	39.25	44.00	43.25	45.50	47.50	54.75	54.75
303	....	30.75	39.50	....	44.00	46.25	48.00	54.50	54.50
304	26.00	32.00	39.00	42.50	43.75	46.00	48.75	53.25	53.25
304L	....	....	46.50	49.50	51.25	53.50	56.25	60.75	60.75
305	27.50	35.25	40.75	45.75	43.75	46.00	49.25	56.50	56.50
308	29.50	36.75	45.50	48.25	50.75	53.50	58.00	60.50	60.50
309	38.25	47.50	55.50	62.00	61.25	64.50	68.25	77.50	77.50
310	47.75	59.25	75.00	81.00	83.25	87.50	89.25	93.00	93.00
314	....	....	....	....	83.25	....	80.25	....	100.50
316	38.25	47.50	59.75	66.50	66.75	70.25	73.75	78.25	78.25
316L	....	....	67.25	73.00	74.25	77.75	81.25	85.75	85.75
317	46.25	57.75	73.75	84.75	83.00	87.25	90.00	97.00	97.00
321	31.00	38.50	45.25	51.50	50.50	53.25	57.50	63.00	63.00
18-8 CbTa	35.50	44.75	53.50	61.00	59.25	62.25	67.00	76.25	76.25
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	59.50	59.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.75	36.25	....	40.50	42.50	44.25	53.75	53.75
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

Stainless	Plates—Carbon Base 5%	10%	15%	20%	Sheets Carbon Base 20%
302	....	....	....	....	35.50
304	33.15	36.20	40.30	44.50	37.75
304-L	35.40	38.80	43.15	47.65	....
316	38.35	41.60	45.90	50.15	55.50
316-L	43.55	47.60	52.70	57.85	....
316-Cb	43.85	48.10	53.40	58.75	....
321	34.90	37.95	42.10	46.40	44.75
347	37.05	41.25	46.45	51.70	54.25
405	27.55	29.20	33.15	37.05	....
410	27.00	28.70	32.65	36.55	....
430	27.00	28.70	32.65	36.55	....
Inconel	47.28	57.90	68.50	79.20	....
Nickel	40.00	50.30	60.65	71.05	....
Nickel, Low Carbon	40.30	50.95	61.65	72.50	....
Monel	41.70	51.90	62.15	72.40	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base —Cold Rolled— 10%	Both Sides
Copper*	33.00	39.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4, and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.43-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%) W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.755
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malle-able	Besse-mer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala. W15	58.50**	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	64.50	65.00	65.50	66.00
Tonawanda,N.Y. W12	64.50	65.00	65.50	66.00
N.Tonawanda,N.Y. T9	....	65.00	65.50	66.00
Boston, deld.	75.79	76.29	76.79	....
Rochester,N.Y., deld.	67.52	68.02	68.52	....
Syracuse,N.Y., deld.	68.62	69.12	69.62	....
Chicago District				
Chicago I-3	64.50	65.00	65.00	65.50
S.Chicago,Ill. R2	64.50	....	65.00	....
S.Chicago,Ill. Y1	64.50	65.00	65.00	....
S.Chicago,Ill. W14	64.50	....	65.00	65.50
Milwaukee, deld.	66.96	67.46	67.46	67.96
Muskegon,Mich., deld.	....	78.83	78.83	....
Cleveland District				
Cleveland R2, A7	64.50	65.00	65.00	65.50
Akron,O., deld.	67.62	68.12	68.12	68.62
Mid-Atlantic District				
Birdsboro,Pa. B10	66.50	67.00	67.50	68.00
Chester,Pa. P4	66.50	67.00	67.50	....
Swedeland,Pa. A3	66.50	67.00	67.50	68.00
New York, deld.	....	73.20	73.70	....
Newark,N.J., deld.	70.52	71.02	71.52	72.02
Philadelphia, deld.	68.38	68.88	69.38	69.88
Troy,N.Y. R2	66.50	67.00	67.50	68.00
Pittsburgh District				
NevilleIsland,Pa. P6	64.50	65.00	65.00	65.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	66.45	66.45	66.98
McKeesRocks,Pa., deld.	....	66.10	66.10	66.63
Lawrenceville, Homestead, Wilmerding,Monaca,Pa., deld.	....	66.76	66.76	67.29
Verona,Trafford,Pa., deld.	66.79	67.32	67.32	67.85
Brackenridge,Pa., deld.	67.10	67.60	67.60	68.13
Midland,Pa. C18	64.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malle-able	Besse-mer
Hubbard,O. Y1	....	....	65.00	....
Sharpsville,Pa. S6	64.50	....	65.00	65.50
Youngstown Y1	....	....	65.00	65.50
Mansfield,O., deld.	69.40	....	69.90	70.40
Duluth I-3	64.50	65.00	65.00	65.50
Erie,Pa. I-3	64.50	65.00	65.00	65.50
Everett,Mass. E1	66.00	66.50	67.00	....
Fontana,Calif. K1	72.50	73.00	....	....
Geneva,Utah C11	64.50	65.00	....	....
GraniteCity,Ill. G4	66.40	66.90	67.40	....
Ironton,Utah C11	64.50	65.00	....	....
Minnequa,Colo. C10	66.50	67.00	67.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	64.50	65.00	65.00	65.50
Cincinnati, deld.	71.04	71.54	....	....

**Phos. 0.70-0.90%; Phos. 0.30-0.60%, $59.50.
‡Phos. 0.70-0.90%; Phos. 0.30-0.50%, $60.

PIG IRON DIFFERENTIALS

Silicon: Add 75 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.25% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1 for each 0.50% silicon or portion thereof over the base grade within a range of 6.50 to 11.50%; starting with silicon over 11.50% add $1.50 per ton for each 0.50% silicon or portion thereof up to 14%; add $1 for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	77.25
Buffalo H1	78.50

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1.25 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$105.50
NiagaraFalls,N.Y. P15	105.50
Keokuk,Iowa Open-hearth & Fdry, $9 freight allowed K2	103.50
Keokuk,Iowa O.H. & Fdry, 12½ lb piglets, 16% Si, max frgt allowed up to $9, K2	106.50

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$78.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	78.50
Troy,N.Y. R2 (Phos. 0.035% max)	72.50
Philadelphia, deld.	80.26
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	69.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	69.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane, San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS			Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Rounds	C.F. Rds.‡	H.R. Alloy 4140††[5]		Carbon	Floor
Atlanta	8.17§	9.37§	9.83§	....	8.21	8.45	10.23	....	8.59	8.55	10.51
Baltimore	7.88	8.98	9.31	....	8.36	8.53	9.13[3]	14.68	8.75	8.26	9.76
Birmingham	7.80	9.00	9.52	....	7.82	8.07	10.12	....	8.20	8.16	10.31
Boston	8.84	9.88	11.06	60.42	8.89	9.07	....	14.69	9.10	9.18	10.68
Buffalo	7.85	9.00	10.75	....	8.05	8.25	8.70	14.50	8.50	8.50	10.05
Chattanooga	7.99	9.24	9.10	....	8.00	8.24	10.04	....	8.44	8.40	10.26
Chicago	7.78	9.00	9.70	53.25	7.82	8.07	8.35	14.15	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.75	50.00	8.14	8.38	8.84	14.46	8.74	8.52	9.78
Cleveland	7.78	8.98	9.60	53.43	7.92	8.16	8.60	14.24	8.57	8.39	9.72
Denver	9.70	11.30	12.49	....	9.80	9.95	10.65	18.89	9.80	9.70	11.40
Detroit	8.03	9.25	10.05	59.50	8.17	8.37	8.70	14.41	8.74	8.51	9.74
Erie, Pa.	7.85	9.00	9.60[10]	....	7.95	8.20	8.70[10]	....	8.50	8.35	9.75
Houston	8.80	9.75	10.99	....	8.85	9.15	9.15	15.00	8.90	8.80	10.30
Jackson, Miss.	8.09	9.34	9.79	....	8.16	8.41	10.23	....	8.54	8.50	10.34
Los Angeles	9.10	12.30	11.25	57.45	9.15	9.20	12.10	15.50	9.15	9.65	11.80
Milwaukee	7.93	9.13	9.83	....	7.95	8.20	8.58	14.28	8.41	8.29	9.62
Moline, Ill.	8.13	9.35	10.05	....	8.17	8.42	8.70	....	8.55	8.51	...
New York	8.45	9.66	10.23	60.20	8.90	9.01	....	14.59	8.91	9.01	10.31
Norfolk, Va.	8.05	...	....	....	8.55	8.60	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.29	50.69	8.82	8.71	9.31	14.51	8.70	8.68	9.70
Pittsburgh	7.78	8.99	10.05	50.00	7.92	8.07	8.60	14.15	8.20	8.16	9.49
Portland, Oreg.	9.20	11.20	11.60	55.20	11.05‡‡	9.35	13.80	14.60	9.35	9.00	12.20
Richmond, Va.	8.00	...	10.14	....	8.55	8.40	10.00	....	8.95	8.40	9.90
St. Louis	8.14	9.34	10.06	73.36	8.19	8.43	8.96	14.51	8.67	8.52	9.86
St. Paul	8.39	9.59	10.31	....	8.43	8.68	9.21	....	8.94	8.90	10.10
San Francisco	9.05	10.95	10.90	53.45	9.05	9.15	12.40	15.60	9.15	9.30	11.55
Seattle	9.55	10.70	11.65	55.20	9.55	9.50	13.40	15.85	9.35	9.30	11.70
Spokane, Wash.	9.55	10.70	11.65	....	9.55	9.50	13.40	16.60	9.35	9.30	11.70
Washington	8.48	9.58	....	....	9.06	9.13	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; §42 in. and under; **⅛-in. and heavier; ††as annealed; ‡‡over 4 in.; §§over 3 in.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 8000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [3]—400 to 999 lb; [5]—1000 to 1999 lb; [8]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beach Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $135; Salina, Pa., $140; Niles, O., $138; Cutler, Utah, $165.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $175; Stevens Pottery, Ga., $185; Cutler, Utah, $233.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Pt. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $150; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $155; E. Chicago, Ind., Joliet, Rockdale, Ill., $160; Lehigh, Utah, $175; Los Angeles, $180.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; E. Chicago, Ind., $167; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $135; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $100; Clearfield, Pa., Portsmouth, O., $102.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $235; Danville, Ill., $238; Philadelphia, Clearfield, Pa., $230; Orviston, Pa., $245.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $295; Danville, Ill., $298; Philadelphia, Clearfield, Orviston, Pa., $305.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $335; Danville, Ill., $338; Philadelphia, Clearfield, Orviston, Pa., $345.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $188.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $310.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $234.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., Luning, Nev., $46; ⅝-in. grains with fines: Baltimore, $72.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $37-$41; 70%, $36-$40; 60%, $33-$36.50. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34-$35; Mexican, all-rail, duty paid, $27-$27.75; barge, Brownsville, Tex., $27.75-$29.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

New Jersey, foundry and basic 62-64% concentrates	25.00-27.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	*nom.*
Brazilian iron ore, 68-69%	35.00-36.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	*$23.00-24.00*
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negotiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian	
48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00
South African Transvaal	
48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00
Turkish	
48% 3:1	$60.00-63.00

Domestic

Rail nearest seller

18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per short ton unit of Sb content, c.i.f. seaboard	
55-60%	*$3.10-3.60*
60-65%	3.60-3.80

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

Sponge iron:	Cents
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b., Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	26.00
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 99.00-290.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb drum, frght allowed	
Carlots	38.20
Ton lots	40.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	*34.80-43.20†*
Bronze, 5000-lb lots	*52.80-57.20†*
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.065
Nickel-Silver, 5000-lb lots	*53.30-57.60†*
Phosphor-Copper, 5000-lb lots	*62.00*
Copper (atomized) 5000-lb lots	*44.50-52.00‡*
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.08
Stainless Steel, 316	$1.44
Tin	14.50*
Zinc, 5000-lb lots	19.75-33.00‡
Tungsten:	Dollars
Melting grade, 99%	
60 to 2000 mesh:	
1000 lb and over	4.00
Less than 1000 lb	4.15
Chromium, electrolytic 99.8% Cr min metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.75-15.75
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$28.85
Cincinnati, deld.	33.78
Buffalo, ovens	30.50
Camden, N. J., ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens	
New England, deld.	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	29.00
Cincinnati, deld.	29.27
Kearny, N. J., ovens	29.75
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.69
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.14
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.80 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.15	$7.15	$7.15	$7.40
Bar Size Angles	*6.95*	*6.95*	*6.95*	*7.05*
Structural Angles	*7.10*	*7.10*	*7.10*	*7.30*
I-Beams	7.50	7.50	7.50	7.75
Channels	*7.55*	*7.55*	*7.55*	*7.80*
Plates (basic bessemer)	9.00	9.00	9.00	9.30
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ⅞ x 0.30 lb per ft	27.17	27.17	27.17	27.64
Barbed Wire (†)	*6.80*	*6.80*	*6.80*	*7.25*
Merchant Bars	*6.95*	*6.95*	*6.95*	*7.30*
Hot-Rolled Bands	*7.15*	*7.15*	*7.15*	*7.55*
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (§)	*8.40*	*8.40*	*8.40*	*8.57*

†Per 82-lb, net, reel. §Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton; $225, Johnstown, Duquesne, Sheridan, Pa., Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74% respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Grade Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 34c; 2000 lb to min carload, 36c; 500 lb to 1999 lb, 38c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 12.8c per lb of alloy. Packed, c.l. 14c, ton 14.45c, less ton 15.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lots 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1 $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13c per lb of contained Si. Packed c.l. 15.5c, ton lot 16.95c, less ton 18.6c, f.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low-Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per lb contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump, or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50 per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx 3⅝ lb each and containing 2 lb of Cr). Contract, carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c; less ton 18.1c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Silicon Briquets: (Large size—weighing approx 5 lb and containing 2 lb of Si). Contract, carload, bulk, 7.7c per lb of briquet; packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $2.95 per lb of contained W; 2000 lb W to 5000 lb W, $3.05; less than 2000 lb W, $3.17. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $5.10 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx, Ta 20% approx, and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.25 per lb of contained Cb plus Ta, delivered; less ton lot $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx). Contract, c.l. packed ½-in. x 12 M 19c per lb of alloy, ton lot 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; Freight allowed to St. Louis.

V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works. Mt. Pleasant, Siglo, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.

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Scrap Market Develops Strength

Prices turning upward after declining steadily since early last December. STEEL's index on the steelmaking grades rises to $43.67, up $1.17

Scrap Prices, Page 148

Pittsburgh—A mill on the fringe of this area bought No. 1 heavy melting scrap for $44, No. 2 heavy melting for $39 and No. 2 bundles for $37 last week—$2 over the prices paid by a major steel firm one week earlier. Factory bundles also sold $2 higher. Other grades increased $1 to $2.

Robert S. Kahn, vice president, Tube City Iron & Metal Co., Glassport, Pa., says lack of buying support will bring further reductions in stainless steel scrap.

"The next area of active mill buying support will be $275 to $300 per ton for 18-8 stainless steel scrap," he said.

Philadelphia — Prices on the major grades of open-hearth scrap are up sharply, with domestic business in No. 1 bundles and No. 1 busheling reported as high as $49, delivered. Eastern mills are competing at higher levels with export buyers for No. 1 heavy melting, No. 2 heavy melting and No. 2 bundles. Tentatively, prices on those grades are holding at $48, $40 and $38, delivered.

New York—Following a decline of several weeks, steel scrap prices have turned upward. Export demands are stronger, and domestic needs are being sustained, with material in tighter supply.

Brokers are now paying $43-$44 for No. 1 heavy melting and No. 1 bundles, $33-$34 for No. 2 heavy melting and $30-$31 for No. 2 bundles. They have increased prices for machne shop turnings to $23-$24, and for mixed borings and turnings to $26-$27 range.

Stainless steel scrap has slumped sharply. Brokers are paying $325 for 18-8 sheets, clips and solids, and $215 for 18-8 borings and turnings. Prices on 430 sheets, clips and solids have been reduced to $60-$70, on 410 to $50-$60.

Cleveland — Despite the absence of active local demand, scrap prices here turned upward last week, reflecting higher bidding on industrial material and purchases of low phos material by a couple Valley mills. On local auto lists No. 1 factory bundles are quoted at $44.50-$45.50, delivered, up about $2.50 a ton. Low phos is up about $3 on sales in the Valley at $46-$47.

Chicago—Light mill buying of scrap and a district steelmaking rate that is hovering just below 90 per cent of capacity apparently explain why steel scrap prices are virtually unchanged. One mill bought No. 1 heavy melting of industrial origin at $41, off $1 from recent sales to another consumer. But the price is about what market observers had expected. This

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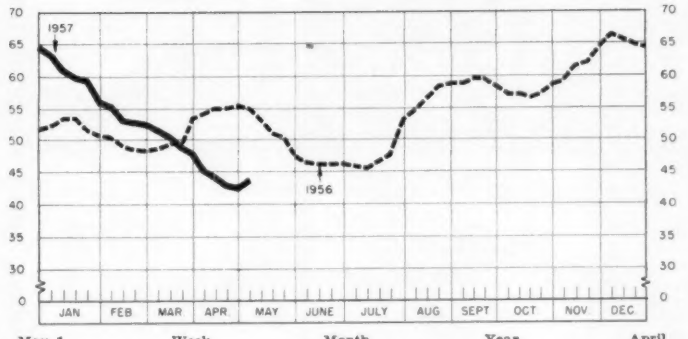
STEELMAKING SCRAP PRICE COMPOSITE

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania—Compiled by STEEL



May 1 1957	Week Ago	Month Ago	Year Ago	April Avg.
$43.67	$42.50	$45.00	$55.00	$43.57

was the only grade the mill indicated it would buy now. Ordinarily, it offers to take No. 1 factory bundles at the same time.

There is another indication the market may have stabilized. Bids on industrial and railroad scrap at the end of last month brought prices which are equal to, or about $1 a ton higher, than last mill sales. This is interpreted to mean that brokers are bidding more to get tonnage needed to fill old and higher priced orders, rather than a price upturn in the market.

Youngstown—The market continues sluggish. One major steel producer bought No. 2 heavy melting at $37 and No. 2 bundles at $34. A few peddlers have stopped collecting because of the lower prices. Industrial scrap tonnage is off. As a result, receipts at dealers' yards are limited.

Cincinnati—The May purchasing program of an area mill shows a stronger pricing trend. No. 2 heavy melting moved to $33-$34, up $1, while No. 2 bundles advanced to $30-$31, up $2, brokers' buying prices. Cast grades, which have lagged behind the drop in steelmaking scrap, last week moved downward in broker listings.

Detroit—There were no changes in scrap prices here last week. Area dealers figure the market is pretty close to bottom. There was a slight upturn on automotive lists at the end of last month, but this may not be reflected in steel mill orders when they come out.

Seattle—The scrap market continues weak. Another adjustment is expected this month. Mill inventories are high, and receipts continue heavy. The export market is active.

Buffalo—Prices are mixed. A slightly firmer tone is reported in some grades, while others are just about holding their own. Dealers expect prices on mill scrap to remain around present levels. There appears to be little pressure on the market, and most traders think the bottom of the decline has been reached.

Supplies are limited, especially the secondary grades. Collections have dropped off noticeably.

Birmingham—The largest buyer of open-hearth scrap here has returned to the market after an absence of four months, purchasing No. 2 heavy melting and No. 2 bundles. The foundries are buying cast scrap, though one large shop is out of the market. Larger buyers of cast are holding the price line, but some small foundries are paying premiums for quality material. Export prices are off $2 to $3 a ton from what they were a week ago at most ports. Some dealers report receipts are about 50 per cent of normal.

San Francisco — Steel scrap prices tumbled here last week, all grades moving down $3 a ton. Reduced mill buying is the reason. Exports continue fairly active.

Los Angeles—Prices are slipping. Small mills are virtually out of the market and larger consumers are buying only light tonnage. Little firming up of the market is

(*Please turn to page* 153)

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Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL, *May* 1, 1957. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

May 1	$43.67
Apr. 24	42.50
Apr. Avg.	43.57
May 1956	50.34
May 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	*38.00-39.00*
No. 1 factory bundles	*48.00-49.00*
No. 1 dealer bundles	*43.00-44.00*
No. 2 bundles	*36.00-37.00*
No. 1 busheling	*43.00-44.00*
Machine shop turnings	*29.00-30.00*
Mixed borings, turnings	*29.00-30.00*
Short shovel turnings	*33.00-34.00*
Cast iron borings	*33.00-34.00*
Cut structurals, 3 ft. lengths	*48.00-49.00*
Cut structurals, 2 ft. and under	*49.00-50.00*
Heavy turnings	*38.00-39.00*
Punchings & plate scrap	*48.00-49.00*
Electric furnace bundles	*48.00-49.00*

Cast Iron Grades

No. 1 cupola	44.00-45.00
Heavy breakable cast.	42.00-43.00
Unstripped motor blocks	34.00-35.00
No. 1 machinery cast	51.00-52.00

Railroad Scrap

No. 1 R.R. heavy melt.	*46.00-47.00*
Rails, 2 ft and under	62.00-63.00
Rails, 18 in. and under	63.00-64.00
Rails, random lengths	59.00-60.00
Railroad specialties	57.00-58.00

Stainless Steel Scrap

18-8 bundles & solids	320.00-330.00
18-8 turnings	220.00-230.00
430 bundles & solids	85.00-90.00
430 turnings	60.00-65.00

CLEVELAND

No. 1 heavy melting	38.00-39.00
No. 1 factory bundles	*44.50-45.50*
No. 2 heavy melting	*36.00-37.00*
No. 1 bundles	38.00-39.00
No. 2 bundles	32.00-33.00
No. 1 busheling	38.00-39.00
Machine shop turnings	*20.00-21.00*
Short shovel turnings	*23.00-24.00*
Mixed borings, turnings	*23.00-24.00*
Cast iron borings	*23.00-24.00*
Cut foundry steel	43.00-44.00
Cut structurals, plates 2 ft and under	*48.00-49.00*
Low phos. punchings & plate	*42.00-43.00*
Alloy free, short shovel turnings	*26.00-27.00*
Electric furnace bundles	*42.00-43.00*

Cast Iron Grades

No. 1 cupola	48.00-49.00
Charging box cast	37.00-38.00
Heavy breakable cast.	37.00-38.00
Stove plate	44.00-45.00
Unstripped motor blocks	30.00-31.00
Brake shoes	37.00-38.00
Clean auto cast	47.00-48.00
Burnt cast	35.00-36.00
Drop broken machinery	50.00-51.00

Railroad Scrap

No. 1 R.R. heavy melt.	45.00-46.00
R.R. malleable	53.00-54.00
Rails, 2 ft and under	66.00-67.00
Rails, 18 in. and under	67.00-68.00
Rails, random lengths	61.00-62.00
Cast steel	55.00-56.00
Railroad specialties	59.00-60.00
Uncut tires	58.00-59.00
Angles, splice bars	59.00-60.00
Rails, rerolling	67.00-68.00

Stainless Steel
(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	310.00-320.00
18-8 turnings	210.00-220.00
430 clips, bundles, solids	75.00-80.00
430 turnings	40.00-50.00

YOUNGSTOWN

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	*38.00-39.00*
No. 1 bundles	41.00-42.00
No. 2 bundles	*35.00-36.00*
No. 1 busheling	41.00-42.00
Machine shop turnings	*20.00-21.00*
Short shovel turnings	*23.00-24.00*
Cast iron borings	*23.00-24.00*
Low phos.	*45.00-46.00*
Electric furnace bundles	*45.00-46.00*

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00

CHICAGO

No. 1 hvy melt, indus.	*40.00-41.00*
No. 1 hvy melt, dealer	38.00-39.00
No. 2 heavy melting	35.00-36.00
No. 1 factory bundles	44.00-45.00
No. 1 dealer bundles	39.00-40.00
No. 2 bundles	32.00-33.00
No. 1 busheling, indus	*40.00-41.00*
No. 1 busheling, dealer	38.00-39.00
Machine shop turnings	23.00-24.00
Mixed borings, turnings	25.00-26.00
Short shovel turnings	25.00-26.00
Cast iron borings	25.00-26.00
Cut structurals, 3 ft	46.00-47.00
Punchings & plate scrap	47.00-48.00

Cast Iron Grades

No. 1 cupola	39.00-40.00
Stove plate	34.00-35.00
Unstripped motor blocks	29.00-30.00
Clean auto cast	44.00-45.00
Drop broken machinery	44.00-45.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.00-47.00
R.R. malleable	53.00-54.00
Rails, 2 ft and under	56.00-57.00
Rails, 18 in. and under	57.00-58.00
Angles, splice bars	53.00-54.00
Rails, rerolling	56.00-57.00

Stainless Steel Scrap

18-8 bundles & solids	330.00-340.00
18-8 turnings	230.00-240.00
430 bundles & solids	75.00-80.00
430 turnings	50.00-55.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	34.00-35.00
No. 2 heavy melting	24.00-25.00
No. 1 bundles	35.00-36.00
No. 2 bundles	24.00-25.00
No. 1 busheling	33.00-34.00
Machine shop turnings	22.00-23.00
Mixed borings, turnings	23.00-24.00
Short shovel turnings	23.00-24.00
Punchings & plate scrap	40.00-41.00

Cast Iron Grades

No. 1 cupola	44.00
Charging box cast	38.00
Stove plate	40.00
Heavy breakable	36.00
Unstripped motor blocks	23.00
Clean auto cast	47.00
Malleable	50.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	39.50
No. 2 heavy melting	37.00
No. 1 bundles	39.50
No. 2 bundles	32.00
No. 1 busheling	39.50
Machine shop turnings	24.00
Short shovel turnings	29.00

Cast Iron Grades

No. 1 cupola	43.00
Charging box cast	35.00
Heavy breakable cast	35.00
Unstripped motor blocks	35.00
Brake shoes	40.00
Clean auto cast	48.00
Stove plate	39.00

Railroad Scrap

No. 1 R.R. heavy melt.	46.50
Rails, 18 in. and under	59.00
Rails, rerolling	58.00
Rails, random lengths	51.00
Angles, splice bars	53.00

PHILADELPHIA

No. 1 heavy melting	*48.00*
No. 2 heavy melting	*40.00*
No. 1 bundles	*48.00-49.00*
No. 2 bundles	*38.00*
No. 1 busheling	*48.00-49.00*
Electric furnace bundles	51.00
Mixed borings, turnings	*32.00-33.00*
Short shovel turnings	36.00-37.00
Machine shop turnings	32.00-33.00
Heavy turnings	42.00
Structural & plate	51.00-53.00
Couplers, springs, wheels	58.00
Rail crops, 2 ft & under	65.00-66.00

Cast Iron Grades

No. 1 cupola	*42.00-44.00*
Heavy breakable cast	54.00
Malleable	62.00
Drop broken machinery	55.00-56.00

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	*33.00-34.00*
No. 1 bundles	*43.00-44.00*
No. 2 bundles	*30.00-31.00*
Machine shop turnings	*23.00-24.00*
Mixed borings, turnings	*26.00-27.00*
Short shovel turnings	27.00-28.00
Low phos. (structurals & plate)	46.00-47.00

Cast Iron Grades

No. 1 cupola	41.00-42.00
Unstripped motor blocks	*32.00-33.00*
Heavy breakable	45.00-46.00

Stainless Steel

18-8 sheets, clips solids	*325.00*
18-8 borings, turnings	*215.00*
430 sheets, clips, solids	*60.00-70.00*
410 sheets, clips, solids	*50.00-60.00*

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	35.00-36.00
No. 2 heavy melting	30.00-30.50
No. 1 bundles	35.00-36.00
No. 2 bundles	28.00-29.00
No. 1 busheling	35.00-36.00
Machine shop turnings	20.00-20.50
Mixed borings, turnings	23.00-24.00
Short shovel turnings	24.00-25.00
No. 1 cast	34.00-35.00
Mixed cupola cast	33.00-34.00
No. 1 machinery cast	42.00-43.00

BUFFALO

No. 1 heavy melting	41.00-42.00
No. 2 heavy melting	37.00-38.00
No. 1 bundles	41.00-42.00
No. 2 bundles	34.00-35.00
No. 1 busheling	41.00-42.00
Mixed borings, turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Short shovel turnings	30.00-31.00
Cast iron borings	29.00-30.00
Low phos.	45.00-46.00

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	39.00-40.00
No. 1 machinery	44.00-45.00

Railroad Scrap

Rails, random lengths	53.00-54.00
Rails, 3 ft and under	59.00-60.00
Railroad specialties	47.00-48.00

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	37.00-38.00
No. 2 heavy melting	*33.00-34.00*
No. 1 bundles	37.00-38.00
No. 2 bundles	*30.00-31.00*
No. 1 busheling	37.00-38.00
Machine shop turnings	25.00-26.00
Mixed borings, turnings	*23.00-24.00*
Short shovel turnings	27.00-28.00
Cast iron borings	23.00-24.00
Low phos. 18 in.	*49.00-50.00*

Cast Iron Grades

No. 1 cupola	*43.00-44.00*
Heavy breakable cast	*42.00-43.00*
Charging box cast	*42.00-43.00*
Drop broken machinery	55.00-56.00

Railroad Scrap

No. 1 R.R. heavy melt.	41.00-42.00
Rails, 18 in. and under	64.00-65.00
Rails, random lengths	54.00-55.00

BIRMINGHAM

No. 1 heavy melting	*37.00-38.00*
No. 2 heavy melting	*31.00-32.00*
No. 1 bundles	*37.00-38.00*
No. 2 bundles	*26.00-27.00*
No. 1 busheling	*37.00-38.00*
Cast iron borings	26.00-27.00
Short shovel turnings	29.00-30.00
Machine shop turnings	27.00-28.00
Bar crops and plate	46.00-47.00
Structurals & plate	44.00-45.00
Electric furnace bundles	43.00-44.00
Electric furnace:	
3 ft and under	41.00-42.00
2 ft and under	42.00-43.00

(F.o.b. shipping point)
Cast Iron Grades

No. 1 cupola	*47.50-48.50*
Stove plate	47.00-48.00
Unstripped motor blocks	38.00-39.00
Charging box cast	34.00-35.00
No. 1 wheels	37.00-38.00

Railroad Scrap

No. 1 R.R. heavy melt.	39.00-40.00
Rails, 18 in. and under	*54.00-55.00*
Rails, rerolling	59.00-60.00
Rails, random lengths	48.00-49.00
Angles, splice bars	52.00-53.00

SEATTLE

No. 1 heavy melting	48.00
No. 2 heavy melting	45.00
No. 1 bundles	45.00
No. 2 bundles	*28.00*
Machine shop turnings	33.00-35.00
Mixed borings, turnings	33.00-35.00
Electric furnace No. 1	62.00

Cast Iron Grades

No. 1 cupola	50.00
Heavy breakable cast	48.00
Unstripped motor blocks	40.00
Stove plate (f.o.b. plant)	42.00

LOS ANGELES

No. 1 heavy melting	*48.00*
No. 2 heavy melting	*43.00*
No. 1 bundles	*47.00*
No. 2 bundles	*33.00*
Machine shop turnings	*35.00*
Shoveling turnings	*37.00*
Cast iron borings	*34.00*
Cut structural and plate, 1 ft and under	*60.00*

Cast Iron Grades
(F.o.b. shipping point)

No. 1 cupola	*54.00*

Railroad Scrap

No. 1 R.R. heavy melt.	*51.00*

SAN FRANCISCO

No. 1 heavy melting	*48.00*
No. 2 heavy melting	*43.00*
No. 1 bundles	*47.00*
No. 2 bundles	*35.00*
Machine shop turnings	*32.00*
Mixed borings, turnings	*32.00*
Cast iron borings	*32.00*
Heavy turnings	*32.00*
Short shovel turnings	*34.00*
Cut structurals, 3 ft	*60.00*

Cast Iron Grades

No. 1 cupola	57.00
Charging box cast	47.00-49.00
Stove plate	48.00
Heavy breakable cast.	42.00
Unstripped motor blocks	50.00
Clean auto cast	57.00
No. 1 wheels	50.00
Drop broken machinery	57.00

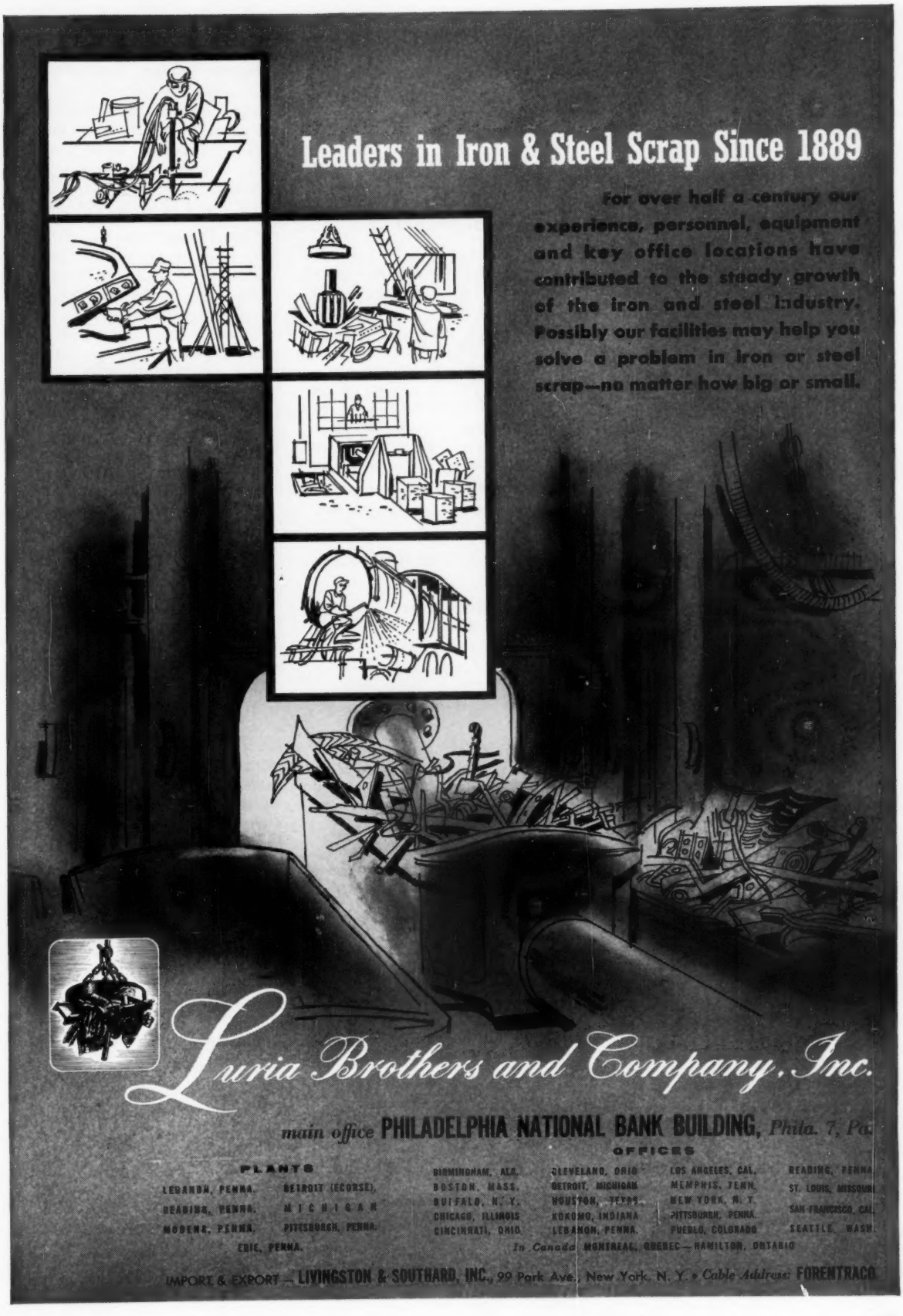
HAMILTON, ONT.

No. 1 heavy melting	43.00
No. 2 heavy melting	38.00
No. 1 bundles	43.00
No. 2 bundles	32.00
Mixed steel scrap	35.00
Mixed borings, turnings	19.00
Busheling, new factory:	
Prepared	43.00
Unprepared	37.00
Short steel turnings	30.00
Rails, rerolling	49.00

Cast Iron Gradest

No. 1 machinery cast	50.00

†F.o.b. Hamilton, Ont.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Barter Battle Shapes Up

Lead and zinc miners feel the government's barter program will do little but invite foreign miners to expand production. Administration officials disagree with the argument

Nonferrous Metal Prices, Pages 152 & 153

WHAT EFFECT will the barter program have on the domestic lead and zinc markets?

Two philosophies are taking shape about this swap of U.S. agricultural surpluses for foreign lead and zinc.

Spurred by an economy-minded Congress, the Interior department contends that by removing foreign excesses from world markets, the U.S. price for the metals will hold steady at 15.80 cents a pound for lead, 13.50 for zinc.

Western Protest—Mining interests contend that this move is only promoting the further expansion of foreign lead and zinc ore bodies throughout the Free World.

Some producers believe production must be cut back. The Eagle-Picher Co. has backed its belief by laying off 1100 workers. It has closed all its zinc mining and mill properties in Kansas, Oklahoma and Missouri.

Future—Look for the barter program to continue. It may be the only support the government will have left to appease mining interests if Congress holds firm and does not reinstate the administration's request for $130 million which it intended to use for the purchase of strategic materials. However, mine state governors, representatives and senators may be able to get at least part of the funds back.

Lead and zinc sales continue to be fair to average. Automotive and appliance orders are still a trickle.

Replacement battery shipments hit the seasonal lull with a vengeance. During March, only 1,266,000 units were shipped. This was a drop of 695,000 from the February total. Bright spot: First quarter shipments (5,865,000 units) are ahead of last year's first three-month totals (4,746,000 units).

Foreign Sales Buoy Copper

Primary and secondary producers interested in selling on an average price are finding ready markets in Italy, Germany, England and France. While U.S. markets are showing slight improvement, foreign shipments are helping keep prices at current levels.

Aluminum Dents R.R. Mart

Eight aluminum baggage car doors may help to get aluminum into the railroad car market. Aluminum Co. of America has fabricated and installed the doors on two Pennsylvania Railroad baggage cars. Weight reduction: About 166 lb a door.

Aluminum sheet sales are showing improvement. Says one rolling mill sales manager: "We have hit the bottom of the cycle, and things are beginning to turn up." Aluminum diecasters are still waiting anxiously for an upturn.

Market Memos

• February shipments of magnesium castings were off 17 per cent from the January total (1331 vs. 1604 tons). The Magnesium Association reports that diecastings increased 7 per cent over January while permanent mold castings held even and sand castings declined 10 per cent. Cast anode shipments dropped to 315 tons.

• Wah Chang Corp. has opened a new zirconium producing facility at Albany, Ga. It will produce reactor (hafnium-free) and commercial grade zirconium. Significance: The plant was built without government assistance or long term U.S. contracts. Says K. C. Li, chairman: "By July of this year, we will be in a position to make quantities of the metal—both reactor and commercial grades—available to industry on a direct sales basis." Wah Chang also operates an Atomic Energy Commission zirconium facility at Albany.

• Trends: Alcoa predicts that 15,000 tons of aluminum will be used for automotive trim parts this year.

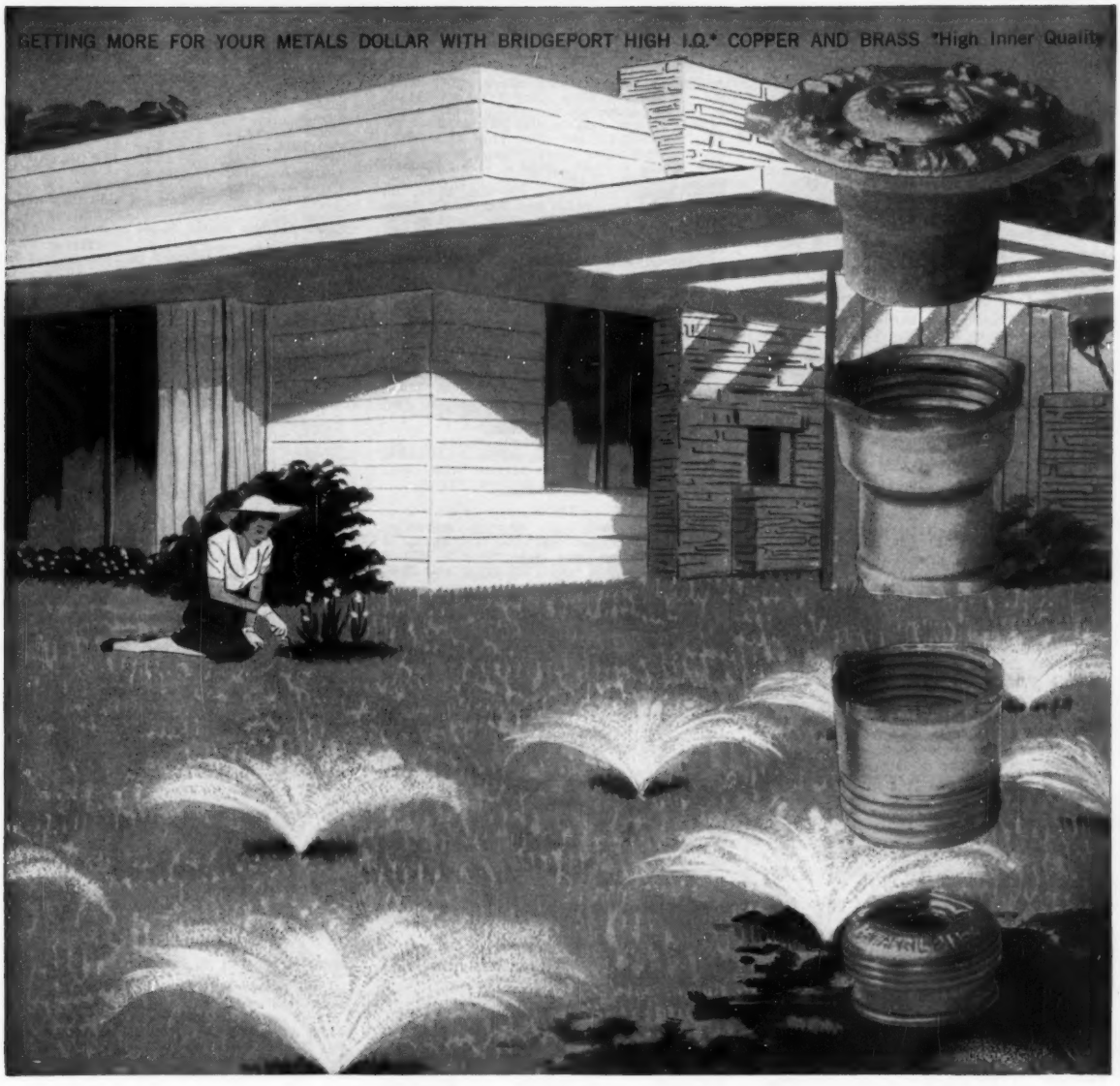
• There are growing indications that the nickel shortage may be abating. Industry sources reveal that some premium-priced nickel being offered for $1 and $1.25 a pound is being refused by most users. The General Services Administration may soon reveal a plan to make more nickel available, too.

• Kaiser Aluminum & Chemical Corp.'s reduction plants in Mead and Tacoma, Wash., have returned to capacity operations following a 45 day cutback of interruptible power due to water conditions.

NONFERROUS PRICE RECORD

	Price May 1	Last Change	Previous Price	Mar. Avg.	Feb. Avg.	Apr., 1956 Avg.
Aluminum ..	27.10	Aug. 10, 1956	25.90	27.100	27.100	24.650
Copper	31.00–32.00	Apr. 13, 1957	31.50–32.00	31.462	32.863	47.500
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	33.150
Nickel	74.00	Dec. 6, 1956	64.50	74.000	74.000	64.500
Tin	99.00	Apr. 30, 1957	98.875	99.683	101.159	99.270
Zinc	13.50	Jan. 6, 1956	13.50	13.500	13.500	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.



How to "water down" a tough forming and machining problem

Is there a metal ductile enough to undergo severe right-angle forming and drawing without cracking? Can this metal be machine-threaded easily and economically inside—and outside, if necessary—after forming? Can all this be done on *our* machines, the way *we* do it?

These questions were asked by Ross Sprinkler Co., Rosemead, Calif., and answered by Bridgeport Medium Leaded Brass Strip, Alloy #63, 12 B&S Gauge—a *standard* Bridgeport Alloy at a *standard* price. The result? The sprinkler head and accessories you see here—plus a lot of satisfaction and production savings.

To help achieve similar efficiency and economy in your operations take advantage of Bridgeport's expert help and assistance in selecting the alloy best suited to your own production requirements and product end use. Call your nearest Bridgeport Sales Office today.

BRIDGEPORT BRASS

Offices in Principal Cities • Conveniently Located Warehouses

Bridgeport Brass Company, Bridgeport 2, Connecticut
In Canada: Noranda Copper and Brass Ltd., Montreal

matched **Bridgeport** **Brass Alloys** *to your job*

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots, 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 241, 30.50; No. 356, 28.90, 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb, ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.
Cobalt: 97-99%, $2.35 per lb for 550-lb keg; $2.37 per lb for 100-lb case; $2.42 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 32.00 deld. Conn. valley; 32.00 deld. Midwest; custom smelters, 31.00 deld.; lake, 32.00 deld.; fire refined, 31.75 deld.

Germanium: First reduction $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis, New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.
Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50. Prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.
Osmium: $80-$100 per troy oz, nom.
Palladium: $23-$24 per troy oz.

Platinum: $92-$95 per troy oz from refineries.
Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $12-$15 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.65 per lb.

Thallium: $12.50 per lb.
Tin: Straits, N.Y., spot, 99.00; prompt, 98.75.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max.), $2.75; grade A-2 (0.5% Fe max.), $2.50 per lb.
Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.00 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $4.75.
Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per lb. New York basis, add 0.50. High grade, 14.85; special high grade, 15.25 deld. Die casting alloy ingot No. 3, 17.50; No. 2, 18.50; No. 5, 18.00 deld.
Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.00-28.75; No. 12 foundry alloy (No. 2 grade), 21.00-22.50; 5% silicon alloy, 0.60 Cu max., 24.00-25.00; 13 alloy, 0.60 Cu max., 24.00-25.00; 195 alloy, 23.75-25.75; 108 alloy, 21.50-22.50. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.00; grade 3, 20.00; grade 4, 19.25.
Brass Ingot: Red brass, No. 115, 31.50; tin bronze, No. 225, 40.50; No. 245, 35.50; high-leaded tin bronze, No. 305, 35.50; No. 1 yellow, No. 405, 25.25; manganese bronze, No. 421, 28.50.
Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nom. 1.9% Be alloy.) Strip, $1.83-$1.86, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.80, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 37.355; l.c.l., 37.98. Weatherproof, 30,000-lb lots, 37.78; l.c.l., 38.53. Magnet wire deld., 15,000 lb or more, 44.68; l.c.l., 45.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 39%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $11.00-$14.75; sheared mill plate, $9.25-$11.25; wire, $8.50-$11.00; forging billets, $6.85-$7.10; hot-rolled and forged bars, $7.10-$7.35.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed).

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.138	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.60
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.50-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. width or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam. (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-Finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diam. 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.0750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
⅛	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	43.10-44.60	57.80-61.80
12-14	43.40-44.80	58.40-62.70
15-17	43.60-45.40	59.60-64.30
18-20	44.10-45.80	61.50-66.80

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0 in., 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60. Tooling plate, .250-3.0 in., 73.0.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots.)

Aluminum: 1100 clippings, 13.00-13.50; old sheets, 9.00-9.50; borings and turnings, 6.00-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	54.13b	51.36c	....	54.32	28.000	28.000	27.250
Yellow Brass	47.52	35.69d	48.06	50.43	21.875	21.625	20.125
Low Brass, 80%	50.20	50.14	50.74	53.01	24.250	24.000	23.500
Red Brass, 85%	51.14	51.08	51.68	53.95	25.000	24.750	24.250
Com. Bronze, 90%	52.63	52.57	53.17	55.19	25.875	25.625	25.125
Manganese Bronze	55.43	49.53	59.77	....	20.500	20.250	19.750
Muntz Metal	49.79	45.60	....	....	20.750	20.500	20.000
Naval Brass	51.69	46.00	58.75	55.10	20.500	20.250	19.750
Silicon Bronze	58.60	57.79	58.64	60.68e	27.375	27.125	26.375
Nickel Silver, 10%	64.06	66.39g	66.39	....	28.250	28.000	14.125
Phos. Bronze, A-5%	73.17	73.67	73.67	74.85	28.875	28.625	27.625

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

6.50; crankcases, 9.00-9.50; industrial castings, 9.00-9.50.

Copper and Brass: No. 1 heavy copper and wire, 24.00-24.50; No. 2 heavy copper and wire, 22.50-23.00; light copper, 20.50-21.00; No. 1 composition red brass, 21.00-21.50; No. 1 composition turnings, 20.50-21.00; yellow brass turnings, 12.00-12.75; new brass clippings, 19.00-19.50; light brass, 12.00-12.50; heavy yellow brass, 14.50-15.00; new brass rod ends, 16.50-17.00; auto radiators, unsweated, 15.50-16.00; cocks and faucets, 16.50-17.00; brass pipe, 17.00-17.50.

Lead: Heavy, 12.00-12.50; battery plates, 6.25-6.75; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 12.00-13.50.

Monel: Clippings, 50.00-55.00; old sheets, 50.00-55.00; turnings, 45.00-50.00; rods, 50.00-55.00.

Nickel: Sheets and clips, 85.00-125.00; rolled anodes, 85.00-125.00; turnings, 75.00-115.00; rod ends, 85.00-125.00.

Zinc: Old zinc, 4.50-5.00; new die-cast scrap, 3.75-4.00; old die-cast scrap, 2.25-2.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 16.50-17.50; 3003 clippings, 16.50-17.50; 6151 clippings, 16.50-17.50; 5052 clippings, 16.50-17.00; 2014 clippings, 15.50-17.00; 2017 clippings, 15.50-17.00; 2024 clippings, 15.50-17.00; mixed clippings, 15.00-16.00; old sheets, 13.50-14.00; old cast, 13.50-14.00; clean old cable (free of steel), 16.50; borings and turnings, 14.00-15.50.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 54.00; light scrap, 49.00; turnings and borings, 34.00.

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.00; light copper 22.75; refinery brass (60% copper) per dry copper content, 24.50.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 27.00; No. 2 heavy copper and wire, 25.00; light copper, 22.75; No. 1 composition borings, 23.00; No. 1 composition solids, 23.50; heavy yellow brass solids, 16.50; yellow brass turnings, 18.00; radiators, 18.00.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 50.29; oval, 49.42, 5000-10,000 lb; electrodeposited, 39.25, 2000-5000 lb lots; cast, 44.00, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab, less than 200 lb, 117.50; 200-499 lb, 116.00; 500-999 lb, 115.50; 1000 lb or more, 115.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: 100 lb, 33.20; 500 lb, 32.70; 2000 lb, 32.05; 5000 lb, 31.75; 10,000 lb, 31.25, f.o.b. Detroit.

Copper Cyanide: 100-1000 lb, 77.50.

Copper Sulphate: 100 lb, 26.65; 200 lb, 23.65; 300 lb, 22.65; 400 lb, 22.15; 500 lb, 20.65; 2000 lb, 18.40; 6000 lb, 18.15; 12,000 lb, 17.90, f.o.b. shipping point.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400 lb, 35.50; 5000 lb, 33.50; 20,000 lb, 33.00; 36,000 lb, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80, f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 78.00; 100-600 lb, 68.80; 700-1900 lb, 66.00; 2000-9900 lb, 64.10; 10,000 lb or more, 62.80.

Stannous Chloride (anhydrous): Less than 25 lb, 167.70; 25 lb, 132.70; 100 lb, 117.70; 400 lb, 115.30; 5200-19,600 lb, 103.10; 20,000 lb, 90.90.

Stannous Sulphate: Less than 50 lb, 130.40; 50 lb, 100.40; 100-1900 lb, 98.40; 2000 lb or more 96.40.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(*Concluded from page* 147)

expected until consumers' inventories are reduced.

Iron Ore . . .

Iron Ore Prices, Page 143

Shipments of Lake Superior iron ore in the week ended Apr. 29 totaled 1,912,741 net tons, reports the Lake Superior Iron Ore Association. This brought shipments to date to 3,251,276 tons. In the last week of April a year ago, shipments were 2,182,286 tons, and the cumulative season tonnage was 5,046,271 tons.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

3500 tons, power plant, Indiana & Michigan Electric Power Co., near Terre Haute, Ind., to the Mississippi Valley Structural Steel Co., Decatur, Ill.; direct through the American Gas & Electric Co., New York.

1000 tons, Miami Beach exhibition hall, Miami Beach, Fla., to the Richmond Steel Co., Richmond, Va., $397,000; bids direct, furnishing and erecting; 12 shops estimated.

640 tons, municipal bridge over the Reading Railroad, Broad street, Philadelphia, through the Kaufman Construction Co., general contractor, that city, to the Bethlehem Steel Co., Bethlehem, Pa.

600 tons, state highway bridges, Wayne county, Mich., to the Bethlehem Steel Co., Bethlehem, Pa.

500 tons or more, three tainter gates, guides, etc., for the Portland General Electric Co.'s North Fork dam, Clackamas river, Oregon, to the Todd Shipyards Corp., Seattle, at $250,221.

485 tons, three grade separations, Northwest expressway, Cook county, Ill., to the Wendnagel Co. Inc., Chicago; bids to the State Department of Public Works, Springfield, Ill.

375 tons, four bridge superstructures, Illinois route 15, Clinton-Washington counties, Ill., to the Illinois Steel Bridge Co., Jacksonville, Ill.

300 tons, Robert E. Lee Junior High School, Pampa, Tex., to the Robberson Steel Co., Oklahoma City, Okla.; Ramey Construction Co., Amarillo, Tex., is general contractor; 75 tons of reinforcing bars to the same fabricator.

300 tons, composite rolled beam bridge, Torrington, Conn., to the Bethlehem Steel Co., Bethlehem, Pa.; Onegilia & Garvasini Inc., Torrington, general contractor.

235 tons, municipal bridge over the Reading Railroad, 21st street, Philadelphia, through the Kaufman Construction Co., general contractor, that city, to the Bethlehem Steel Co., Bethlehem, Pa.

220 tons, central heating plant, Rome, N.Y., through the Five-Boro Construction Co., to the White Plains Iron Works, Peekskill, N.Y.

160 tons, plant building, Air Reduction Co. Inc., Acton, Mass., to Frank M. Weaver & Co., Lansdale, Pa.; United Engineers & Constructors, Philadelphia, general contractor.

145 tons, two bridges, Winchester, Conn., to the Bethlehem Steel Co., Bethlehem, Pa.; White Oak Excavators Inc., Plainville, Conn., general contractor.

STRUCTURAL STEEL PENDING

13,500 tons, state bridge work, Brooklyn-Queens expressway, Kings county, New York, Gull Construction Co., Flushing, N.Y., low on general contract.

7200 tons, state bridge work, Roosevelt boulevard, Philadelphia, McCloskey & Co., that city, low on the general contract.

5433 tons, state bridge work, Dauphin and Cumberland counties, Pa.; bids May 24; also required are 966 tons of reinforcing bars.

3000 tons, state bridge work, Rensselaer and Columbia counties, New York, Lane Construction Co., Meriden, Conn., low on general contract.

2300 tons, bridge work, Oswego county, New York; no bids received for the third time.

1000 tons, Leob Student Center, New York University, Washington Square, New York; bids closed May 1.

1550 tons, bridge steel bids May 7, Corps of Engineers, Huntington, W. Va.; also 55 tons of steel castings.

1100 tons, state bridge, York county, Pa., Nello Teer Co., Durham, N.C., low on the general contract.

700 tons, A. & P. warehouse, Halethorpe, Md.

700 tons, also 170 tons of reinforcing, Oregon state 910-ft highway span, Marion and Linn counties; bids to Portland, Oreg., May 17.

560 tons, pier 2, Port of New York Authority, Brooklyn, N. Y.; White Plains Iron Works, Peekskill, N.Y., low bidder.

600 tons, coal handling facilities, Port of New York Authority, 59th street, New York; rebid last week.

REINFORCING BARS . . .

REINFORCING BARS PLACED

990 tons, flood control project, unit 6, North Adams, Mass., to the Truscon Steel Division, Republic Steel Corp., Boston; Petricca Con-

CLASSIFIED

Representatives Wanted

REPRESENTATIVES WANTED

AAA1 manufacturer of traveling cranes, jib cranes, etc., wants active representation in Baltimore, Philadelphia, Connecticut, Massachusetts, Milwaukee and Springfield, Illinois areas. Commission basis. Address Box 548, STEEL, Penton Bldg., Cleveland 13, Ohio.

COMMISSION REPRESENTATIVE WANTED

Additional sales outlets are needed in Chicago, Boston, Houston, Florida and New Orleans to sell a complete service of roll formed shapes including butt and lock-seam tubing, mouldings, angles, channels and functional shapes. If you have a successful organization calling on users of steel and nonferrous metals, our line should be of interest. Please write giving full information.

ROLL FORMED PRODUCTS CO.
P.O. Box 418 Youngstown, Ohio

MANUFACTURERS' REPRESENTATIVE LOCATED IN DETROIT, MICHIGAN

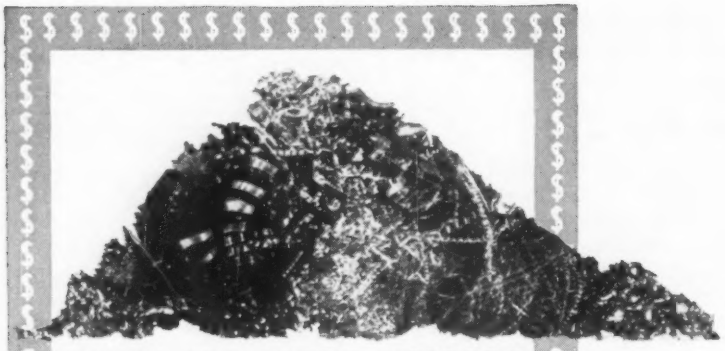
Who has years of experience knows his way around with contacts and enjoys working. Also money. Will consider representing a firm which has potentials, is progressive, has knowhow, has equipment, also competitive, in auto and allied industries on production items.

ADDRESS BOX 549, STEEL
Penton Bldg. Cleveland 13, Ohio

COMPLETE STEEL FABRICATING FACILITIES

CONTRACT MANUFACTURING
ENGINEERING—DESIGNING

KLOCKNER STEEL PRODUCTS, INC.
164 Franklin Avenue
Rockaway, N. J.
RO. 9-2340



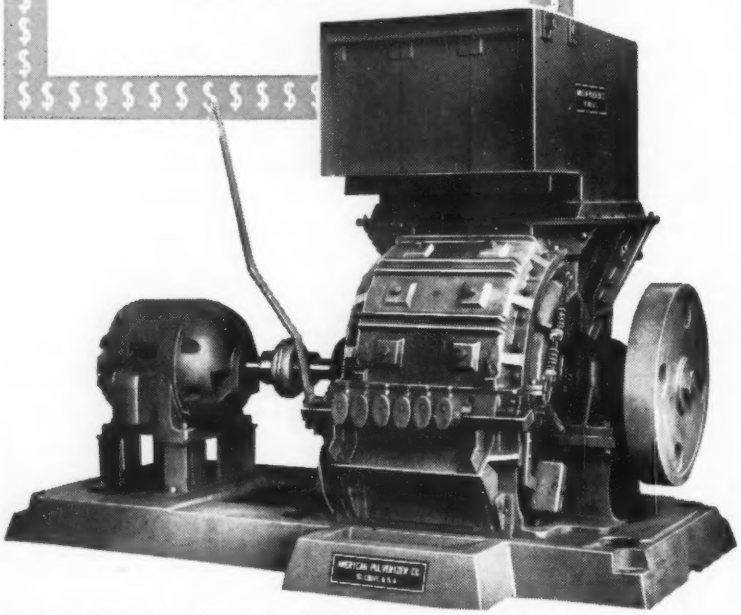
THERE ARE EXTRA DOLLARS IN THIS SCRAP PILE!

...when you install an

American

METAL TURNINGS

CRUSHER



Pays for itself in 3 Profitable Ways:

1. **TOP SCRAP VALUE.** Uniform short shoveling turnings produced by an American bring up to $4 per ton more than regular machine shop turnings.
2. **INCREASED CUTTING OIL RECOVERY.** Up to 50 gallons per ton are released from turnings reduced in an American.
3. **EASIER HANDLING, STORAGE.** American-reduced turnings require but a fraction of the usual storage space.. are easily briquetted.

Available in 1 to 10 tons per hour capacities to meet your needs. WRITE today for the complete American profit story.

American

PULVERIZER COMPANY

Designers and Manufacturers of Ring Crushers and Pulverizers

1539 MACKLIND AVE. • ST. LOUIS 10, MO.

struction Co., Pittsfield, Mass., is general contractor.

850 tons, also 400 squares of mesh, plant building, Texas Instruments Inc., Richardson, Tex., to the Southern States Steel Corp., Dallas; Robert E. McKee Inc., Dallas, general contractor; structurals and miscellaneous iron to the Park Iron Works, Dallas.

525 tons, junior high school, Baltimore, to the Bethlehem Steel Co., Bethlehem, Pa., through John McShain Inc., general contractor.

285 tons, Noxon Rapids power project, Montana, for the Washington Water Power Co., Spokane, Wash., to the Bethlehem Pacific Coast Steel Corp., Seattle.

150 tons, junior high school, Baltimore, to the Maryland Steel Products Co., that city, through John McShain Inc., general contractor.

100 tons, county shops, Yakima, Wash., to the Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

1186 tons, state bridge work, University avenue, Philadelphia, bids May 10; 3770 tons of fabricated structural steel also required, as noted in a recent issue.

1141 tons, 2.59 miles of Tri-State route, Northern Illinois toll highway, contract T-2A, Bremen and Worth townships, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids May 16.

966 tons, state bridge work, Dauphin and Cumberland counties, Pa.; bids May 24; also required, 5433 tons of structural steel.

892 tons, state bridge work, Mifflin county, Pa., bids May 10; also 2128 tons of fabricated structural steel.

683 tons, 3.3 miles of Tri-State route, Northern Illinois toll highway, contract T-2B, Worth township, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids May 16.

650 tons, 2.45 miles of Tri-State route, Northern Illinois toll highway, contract T-2C, Worth and Palos townships, Cook county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids May 16.

282 tons, state bridge work, Washington county, Pa., bids May 10; also 126 tons of fabricated structural steel.

270 tons, state highway bridge and structures, Derby-Shelton-Ansonia, Conn.; bids May 6, Hartford, Conn.; also 220 tons of mat reinforcement and 35 tons of steel piling.

250 tons, 2035-ft earthfill dam; bids to the Bureau of Reclamation, Grand Junction, Colo., June 6.

PLATES . . .

PLATES PLACED

365 tons, hull plates, Air Force Depot, Topeka, Kans., to the Miller Steel Co., Kokomo, Ind.

PLATES PENDING

550 tons or more, oil storage tanks, Naval installation, Adak, Alaska; bids in on several schedules.

350 tons, 1-million-gal standpipe, Niskayuna, N.Y.; bids May 17, town clerk.

RAILS, CARS . . .

LOCOMOTIVES PLACED

Anglo-Lautaro Nitrate Corp., Chile, 11 diesel-electric Locomotives, to the General Electric Co., Schenectady, N.Y.

Cuban Dominican Sales Corp., 12 standard gage, 660-hp diesel units, to General Electric Co., Schenectady, N.Y.

RAILROAD CARS PLACED

Southern Railway, 2650 freight cars, placed: 1200 gondolas, 600 covered hoppers and 200 boxcars to the Pullman-Standard Car Mfg. Co., Chicago; 500 hoppers to the ACF Industries Inc., New York; 100 drop-end gondolas to the Greenville Steel Car Co., Greenville, Pa.; 50 covered hoppers to the General American Transportation Corp., Chicago.

Baltimore & Ohio, 2000 open-top drop-bottom hoppers, to the Bethlehem Steel Co., Bethlehem, Pa.; because of a typographical error, this award was recently reported as involving only 200 cars.

Seaboard Air Line, ten steel boxcars, to its own shops at Portsmouth, Va.

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there's so much to choose from at...

HOTEL CLEVELAND

Cleveland Room

Dine in the splendid old world setting of a grand dining room. The menu is varied, the service unexcelled.

Bronze Room

One of the brightest of the city's supper clubs. Dancing nightly from 9:00 p.m.
Air conditioned, of course.

Rib Room

A true specialty restaurant
For Fabulous Roast Beef, roasted, carved and served to your order.

MEN'S BAR

Strictly stag — is this all male haven for good drinks, good food and good talk.
Plus sports events on TV.

TRANSIT BAR

For *rapid* service in the most unique bar in the country . . decorated with an outstanding collection of miniature trains.

the PATIO

Pause — in the relaxing, informal atmosphere of the gayly decorated Patio. It's a Cleveland habit to say — "Meet me at the Patio."

Coffee Shop

Service is brisk and decor cheerful in the modern, air-conditioned coffee shop. Enjoy a tasty sandwich or a moderately priced meal.

Hotel Cleveland
CLEVELAND, OHIO

WRITE OR CALL FOR YOUR RESERVATIONS NOW

Life of These Punches Went Up

350%

with

Allegheny Ludlum

DBL-3

HIGH SPEED STEEL

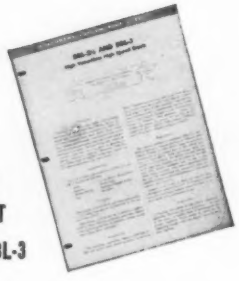
Application of Special Heat Treatment Did the Trick:

These DBL-3 punches (2⅞" dia. by 10½" long) are used to draw and flatten hot or cold rolled stock .140" thick. With conventional heat treatment, their performance was 25% better than Material B and 50% better than Material C. But A-L Metallurgical Service recommended the *additional* heat treatment listed below, improving the performance of DBL-3 to 150% over B *and 350% over Grade C!*

1. Carburize at 1950°F
2. Oil Quench
3. Draw at 1025°F
4. Draw at 1025°F again
5. Finish grind
6. Draw at 750°F to relieve grinding stress
7. Nitride 72 hours at 950°F (case depth of approx. .015)

Allegheny Ludlum DBL-3 holds a fine grain over a wide hardening range. With its higher carbon and vanadium content, it also has better abrasion resistance than other standard high speed tool steels. Our Metallurgical Service is ready to help improve *your* production operations, too. Just call our nearest branch office, or write today, to . . . *Allegheny Ludlum Steel Corporation, Oliver Bldg., Pittsburgh 22, Pa.*

For nearest representative, consult Yellow Section of your telephone book.



Write for BLUE SHEET on DBL-3

This concise four-page folder gives all needed handling and shop treatment details on DBL-3. Included is certified laboratory information on physical characteristics, and complete data on forging, annealing, hardening, tempering, etc. *Ask for your copy.*

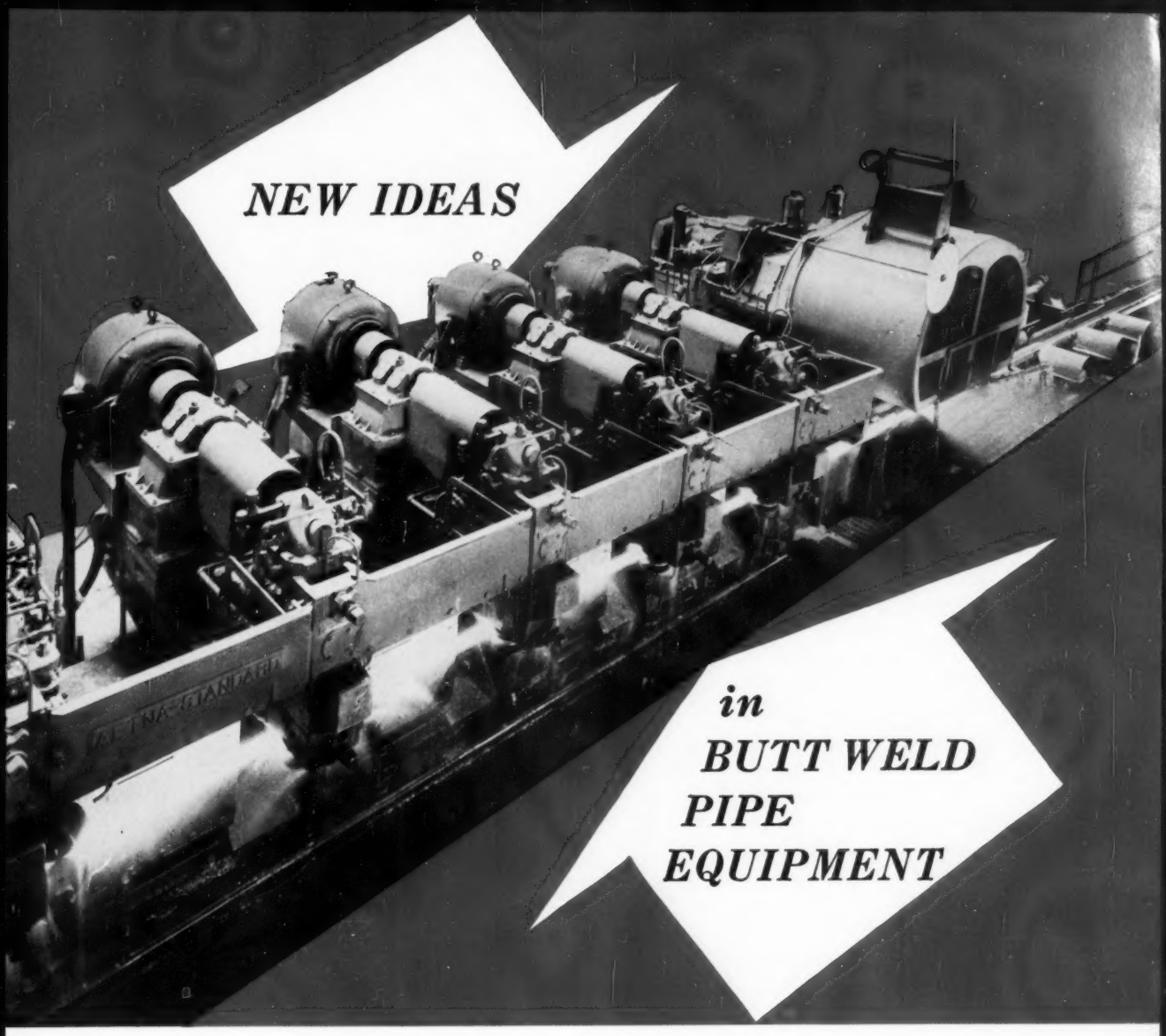
ADDRESS DEPT. S-89

For complete MODERN Tooling, call

Allegheny Ludlum

WSW 6430

AL® FINE TOOL STEELS SINCE 1854



UNCOILER-LEVELLER . . . Equipment includes automatic handling, weighing, storage, and uncoiling of coiled skelp ahead of flash welder. One man operation. Improved leveller has skelp deflector roll, adjustable independent of leveller roll bank.

ROTARY FLYING HOT SAW . . . Saw adjustments can be made to select any cutting length without reducing delivery speed from mill. Saw adjustment permits cutting single pipe lengths from 18 feet to 60 feet.

AUTOMATIC PIPE SELECTOR releases pipe at predetermined intervals. Controls gap between consecutive lengths of pipe. Eliminates overlapping of pipes as they enter Straightener. Eliminates need for operator to regulate continuous flow of pipe.

TRAVELING CRADLES facilitate removal of crane lifts of pipe from the line of production to maintain full mill efficiency.

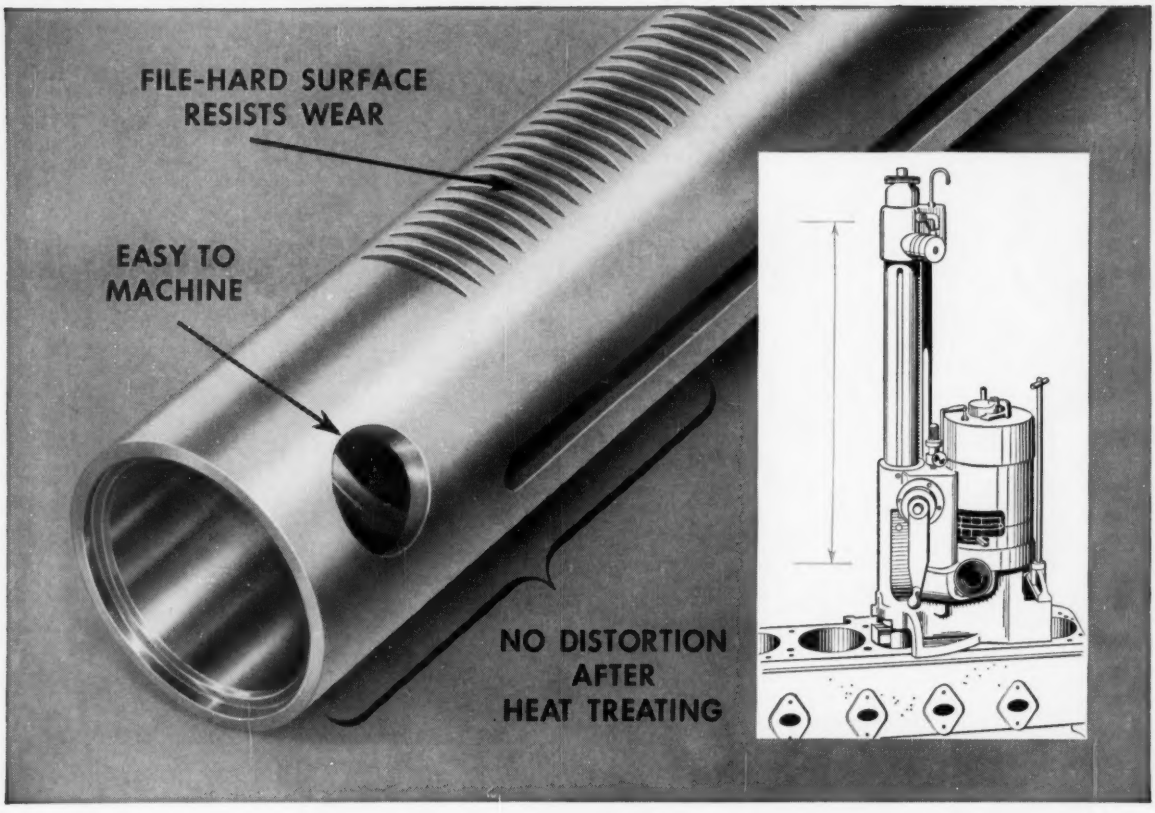
POSITIVE TRANSFER of pipe from Screw Type Kickoff, following Sizing Mill, to Screw Type Cooling Bed.

AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. **PLANTS: ELLWOOD CITY, PA., WARREN, OHIO**

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC



Boring bar maker solves heat-treat distortion problem by switching to TIMKEN® 52100 steel

HEAT-TREATING distortion was running up the manufacturing costs of the boring bars Van Norman Automotive Equipment Company makes for reboring hard-sleeve cylinder blocks. The column of the boring bar, which acts as the spindle, had to be extremely straight. Yet many of them were distorting after heat treatment. And that meant putting them through an extra straightening process.

Studying the problem, metallurgists of the Timken Company suggested a switch to Timken® 52100 steel. Since this steel is hard and tough, it had the qualities Van Norman wanted. And because it responds uniformly to heat treatment it proved to be the answer to their production problem.

By switching to Timken 52100 steel, Van Norman eliminated the need for the costly straightening operation. And as a bonus, they've found that Timken 52100 steel is easier to machine than the steel they previously used.

The Timken Company pioneered the development of 52100 and is one of the principal producers of the steel—the only source of the grade in three finished forms: bars, tubing and wire. You can rely on the Timken Company for small run or emergency requirements as well as mill quantities.

We stock 101 sizes of 52100 steel tubing, ranging from 1″ to 10½″ O.D. For a complete stock list of available sizes, grades and finishes, write The Timken Roller Bearing Company, Canton 6, Ohio. Cable: "TIMROSCO".

TIMKEN *Fine Alloy* **STEEL**

TRADE-MARK REG. U. S. PAT. OFF.

SPECIALISTS IN FINE ALLOY STEELS, GRAPHITIC TOOL STEELS AND SEAMLESS STEEL TUBING